BULLETIN

DE LA

SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

TRENTE-SEPTIÈME ANNÉE

VINGT-HUITIÈME VOLUME

1944

BULLETIN

DE LA

SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

FONDÉE LE 1er AOUT 1907

anciennement :

Société Entomologique d'Egypte (1907-1922)
et *Société Royale Entomologique d'Egypte* (1923-1937)

Placée sous le Haut Patronage du Gouvernement Egyptien
par Décret Royal en date du 15 Mai 1923

Année 1944

LE CAIRE
IMPRIMERIE PAUL BARBEY
—
1944

Les opinions émises dans les publications de la Société sont propres à leurs auteurs. La Société n'en assume aucunement la responsabilité.

Date de parution et de distribution du présent Volume :
31 Décembre 1944

Le Rédacteur en Chef :
A. ALFIERI

DÉCRET DONNANT LE NOM DE FOUAD PREMIER A DES INSTITUTIONS PUBLIQUES CRÉÉES SOUS SES AUSPICES [1]

Nous, FAROUK Ier, Roi d'Egypte,

Sur la proposition du Président de Notre Conseil des Ministres tendant à perpétuer le souvenir de feu le Roi Fouad Premier et à glorifier son nom, vu que son règne s'est distingué par des œuvres éminentes dans le domaine des réformes et par la création de maintes institutions publiques dont la réalisation s'est accomplie grâce à ses conseils et à sa sollicitude, ce qui a eu la plus grande influence sur l'orientation et le développement de la renaissance scientifique, littéraire, sociale et économique de l'Egypte;

Sur l'avis conforme de Notre Conseil des Ministres;

DECRETONS

Art. 1. — Le nom de Fouad Premier est donné aux institutions et établissements indiqués au tableau annexé au présent décret. [2]

Art. 2. — Le Président de Notre Conseil des Ministres est chargé de l'exécution du présent décret, qui entrera en vigueur dès sa publication au « Journal Officiel ».

Fait au Palais de Montazah, le 11 Gamad Tani 1357 (7 Août 1938).

FAROUK

Par le Roi :

Le Président du Conseil des Ministres p.i.

ABDEL-FATTAH YEHIA

(*Traduction*)

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(1) Extrait du *Journal Officiel* du Gouvernement Egyptien, N° 94, du Jeudi 11 Août 1938.

(2) Parmi ces institutions et établissements, figure, sub 7: *Société Fouad Ier d'Entomologie* **au lieu de** *Société Royale Entomologique d'Egypte.*

DÉCRET NOMMANT LE PRÉSIDENT DE LA SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE (1)

Nous, FAROUK Ier, Roi d'Egypte,

Vu le Décret du 15 Mai 1923 approuvant les Statuts de la Société Royale d'Entomologie d'Egypte (Société Fouad Ier d'Entomologie) ;

Sur la proposition du Président de Notre Conseil des Ministres et l'avis conforme du dit Conseil ;

DECRETONS

Art. 1. — Mahmoud Tewfik Hifnaoui Bey, Ministre de l'Agriculture, est nommé Président de la Société Fouad Ier d'Entomologie.

Art. 2. — Le Président de Notre Conseil des Ministres est chargé de l'exécution du présent décret.

Fait au Palais d'Abdine, le 6 Moharram 1359 (14 Février 1940).

FAROUK

Par le Roi :

Le Président du Conseil des Ministres,

ALY MAHER

(Traduction)

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(1) Extrait du *Journal Officiel* du Gouvernement Egyptien, 67eme année, N° 18, du Lundi 19 Février 1940.

HAUTS PROTECTEURS
DE LA SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

Le Très Regretté Roi FOUAD Ier

et

Sa Majesté le Roi FAROUK Ier

MEMBRES BIENFAITEURS

1924

M. Moustapha Mourad El-Salanekli Bey, de Damanhour (Béhéra).

1925

S.E. El-Sayed Fathallah Mahmoud Pacha, de Rahmania (Béhéra) ; M. Riad Abdel-Kawi El-Gebàli Bey, de Chebin-El-Kom (Menoufia) ; S.E. Georges Wissa Pacha, d'Assiout (Haute-Égypte) ; M. Yehia Kawalli Bey, de Minieh (Haute-Egypte) ; M. Yacoub Bibawi Attia Bey, de Minieh (Haute-Egypte) ; S.E. Hassan Charawi Pacha, de Minieh (Haute-Egypte) ; S.E. Habib Chenouda Pacha, d'Assiout (Haute-Egypte) ; M. Mohamed Tewfik Mohanna Bey, de Tewfikieh (Béhéra) ; M. Hassan Ahmed Moussa Bey, de Minieh (Haute-Egypte) ; M. Labib Barsoum Hanna Bey, de Minieh (Haute-Egypte) ; S.E. Hassan Mohamed El-Tahtawi Pacha, de Guirgheh (Haute-Egypte) ; M. Kassem Osman El-Labban Bey, de Guirgheh (Haute-Egypte) ; M. Dordeir El-Sayed Ahmed El-Ansari Bey, de Guirgheh (Haute-Egypte) ; M. Barsoum Said Abdel-Messih Bey, de Minieh (Haute-Egypte) ; M. Dordeir Taha Abou-Gounema Bey, de Minieh (Haute-Egypte).

1926

M. Mohamed Rifaat El-Roznamgy Bey.

1927

M. le Dr. Walter Innes Bey (décédé en 1937) ; M. le Dr. Avocat Giovanni Ferrante, du Caire.

1928

M. le Professeur Hassan C. Efflatoun Bey, du Caire ; M. Hugo Lindeman (décédé en 1937).

1932

M. Alfred Reinhart (décédé en 1935).

ORGANISATION ADMINISTRATIVE POUR L'ANNÉE 1944

Membres du Conseil

S.E. le Prof. Mahmoud Tewfik Hifnaoui Bey, *Président.*

M. le Prof. Hassan C. Efflatoun Bey, *Vice-Président.*

M. Mohamed Soliman El-Zoheiry, *Vice-Président.*

M. Anastase Alfieri, *Secrétaire-Général.*

M. Richard Wilkinson, *Trésorier.*

M. le Dr. Assaad Daoud Hanna.

M. le Dr. Mohamed Shafik Bey.

M. le Prof. Dr. Kamel Mansour.

M. Abdel-Megid El-Mistikawy.

M. le Prof. Dr. Hamed Seleem Soliman.

M. le Dr. Saadallah Mohamed Madwar.

M. Edgard Chakour.

Comité Scientifique

M. le Prof. Hassan C. Efflatoun Bey, M. le Prof. Dr. Kamel Mansour, M. le Dr. Assaad Daoud Hanna, M. le Prof. Dr. Hamed Seleem Soliman, M. le Dr. Saadallah Mohamed Madwar, M. Mohamed Soliman El-Zoheiry, M. Anastase Alfieri.

Censeurs

M. le Dr. A. Azadian et M. E. Kaourk.

LISTE DES MEMBRES

DE LA

SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

EN 1944

(Les noms des Membres Fondateurs sont précédés de la lettre F)

Vice-Président Honoraire

F FERRANTE (Dr. Avocat Giovanni), 14, Sharia El-Nemr, au Caire.

Membres Honoraires

1908 ALLUAUD (Charles), Les Ouches à Crozant (Creuse), France.

1924 EBNER (Prof. Richard), 3, Beethovengasse, Vienne (IX), Allemagne.

1909 MARCHAL (Dr. Paul), 45, Rue de Verrières, Antony (Seine), France.

1929 PARENT (l'Abbé O.), Institut Calot, Berk-Plage, Pas-de-Calais, France.

» PEYERIMHOFF DE FONTENELLE (P. de), 87, Boulevard Saint-Saëns, Alger, Algérie.

1908 PIC (Maurice), 3, Rue du Pont Neuf, Digoin (Saône-et-Loire), France.

1940 SILVESTRI (Prof. F.), Ecole Royale Supérieure d'Agriculture, Portici (Naples), Italie.

1929 THÉRY (André), Laboratoire d'Entomologie, Museum National d'Histoire Naturelle, 45 bis, Rue de Buffon, Paris (Ve), France.

1943 UVAROV (Dr. B.P.), British Museum (Natural History), Londres, S.W. 7, Angleterre.

1920 VILLENEUVE (Dr. Joseph), Rue Président Paul Doumer, Rambouillet (Seine-et-Oise), France.

F WILLCOCKS (F.C.), « Brambles », Hurst Lane, Sedlescombe (near Battle), Sussex, Angleterre.

Membres Correspondants

1932 ALFKEN (J.D.), 18, Delmestrasse, Brême, Allemagne.
» BALLARD (Edward), District Commissioner's Office, Jerusalem, Palestine.
1924 CROS (Dr. Auguste), 6, Rue Dublineau, Mascara, Algérie.
» FLOWER (Major Stanley Smyth), Tring, Herts, Angleterre.
1934 GADEAU DE KERVILLE (Henri), 7, Rue du Passage-Dupont, Rouen (Seine-Inférieure), France.
1926 HALL (Dr. W.J.), c/o The Imperial Institute of Entomology, 41, Queen's Gate, London S.W.7.
1923 HERVÉ-BAZIN (Jacques), 44, Quai Béatrix, Laval (Mayenne), France.
1924 HINDLE (Prof. Dr. Edouard), Magdelene College, Cambridge, Angleterre.
1923 HUSTACHE (A.), Pensionnat Saint-Laurent, Lagny (Seine-et-Marne), France.
1925 KIRKPATRICK (Thomas Winfrid), East African Agricultural Research Station, Section of Entomology, Amani (via Tanga), Tanganyika Territory, British East Africa.
1934 KOCH (C.), c/o Monsieur Georges Frey, 18, Pienzenauerstrasse, Munich (27), Allemagne.
1929 MASI (L.), Museo Civico di Storia Naturale « Giacomo Doria », 9, Via Brigata Liguria, Genova (102), Italie.
1928 ORCHYMONT (A. d'), 176, Avenue Houba de Strooper, Bruxelles (II), Belgique.
1934 PAOLI (Prof. Guido), Directeur du Reale Osservatorio per le Malatie delle Piante, 1, Via Marcello Durazzo, Genova, Italie.
» SCHATZMAYR (A.), Museo Civico di Storia Naturale, Corso Venezia, Milano, Italie.
1927 WILLIAMS (C.B.), Rothamsted Experimental Station, Harpenden, Herts, Angleterre.

Membres Titulaires

1913 ABAZA Pacha (S.E. Fouad), Directeur Général de la Société Royale d'Agriculture, Boîte Postale N° 63, au Caire.
1943 ABOUL-NASR (Ahmed Emad El-Din), Démonstrateur au Département d'Entomologie, Faculté des Sciences, Université Fouad I^{er}, Abbassia, au Caire.
1923 AGRICULTURAL RESEARCH INSTITUTE LIBRARY, Wad-Medani, Soudan.

1908 ALFIERI (Anastase), Secrétaire Général et Conservateur de la Société Fouad I^er^ d'Entomologie, Boîte Postale N° 430, au Caire.

1941 AMIN EL-DIB (Abdel-Latif), Faculté d'Agriculture, Université Farouk I^er^, Damanhour, Basse-Egypte.

1943 AMMAR (Mohamed Abdel-Guélil), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 ATALLAH (Albert), Démonstrateur au Département d'Entomologie, Faculté des Sciences, Université Fouad I^er^, 10, Sharia Masoud Baraka, Ard Raif, Choubrah, au Caire.

1938 ATTIA (Rizk), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1924 AZADIAN (Dr. A.), 11, Sharia El-Mahatta, Helmieh, près le Caire.

1938 BAILEY BROS AND SWINFEN LTD., 11, Ronalds Road, Highbury, London, N. 5, Angleterre.

1929 BICHARA (Ibrahim), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1938 BLANCHETEAU (Marcel), Aux Amateurs de Livres, 56, Faubourg Saint-Honoré, Paris (VIII^e^).

1939 BLARINGHEM (Louis), de l'Institut de France, Conservateur de l'Arboretum G. Allard, 77, Rue des Saints-Pères, Paris (VI^e^), France.

1923 BODENHEIMER (Prof. F.S.), Hebrew University, Jerusalem, Palestine.

1944 BROWN (T.W.), Sharia Talaat, Ghizeh, près le Caire.

1938 CARNERI (Alexandre), Librairie Elpénor, 10, Sharia Chakour Pacha, Alexandrie.

1929 CASSAB (Antoine), Section d'Entomologie, Ministère de l'Agriculture Dokki (Ghizeh), près le Caire.

1943 CHAARAWI (Ahmed Mounir), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

F CHAKOUR (Edgard), Secrétaire Général de la Société Anonyme des Eaux du Caire, Boîte Postale N° 55, au Caire.

1931 COMPAGNIE UNIVERSELLE DU CANAL MARITIME DE SUEZ (Monsieur l'Agent Supérieur de la), 20, Sharia Dar El-Chefa, Kasr El-Doubara, Boîte Postale N° 2120, au Caire.

1944 COYNE (Dr. F.P.), c/o United Kingdom Commercial Corporation, 14, Sharia Darih Saad, au Caire.

1934 Crédit Foncier Egyptien (Monsieur l'Administrateur-Délégué), 35, Sharia El-Malika Farida, au Caire.

1944 Daira Draneht Pacha, Sarawella, par Kafr-Dawar, Basse-Egypte.

1938 Directorate-General of Agriculture, Ministry of Economics, Baghdad, Irak.

1928 Dollfus (Robert Ph.), Museum National d'Histoire Naturelle, 57, Rue Cuvier, Paris (V^me^), France.

1919 Efflatoun Bey (Hassan C.), Professeur d'Entomologie et Vice-Doyen de la Faculté des Sciences, Université Fouad I^er^, Abbassieh, au Caire.

1944 Faculté d'Agriculture (Bibliothèque de la), Université Farouk I^er^, Damanhour (Béhéra), Basse-Egypte.

1934 Faculté d'Agriculture, Université Fouad I^er^, Sharia El-Madares, Ghizeh, près le Caire.

1941 Fahmy (Aly), Section d'Entomologie, Ministère de l'Agriculture. Dokki (Ghizeh), près le Caire.

1914 Garboua (Maurice), 1, Midan Soliman Pacha, au Caire.

1907 Garozzo (Arturo), Ingénieur Civil, 5, Sharia Champollion, au Caire.

1938 Ghabn (Dr. Abdel-Aziz), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1927 Ghali Pacha (S.E. Wacef Boutros), c/o M. Saba Habachi Bey, 41, Sharia El-Malika Farida, au Caire.

1938 Ghesquière (J.), 87, Avenue du Castel, Bruxelles (W. St L.), Belgique.

1921 Greiss (Elhamy), Département de Botanique, Faculté des Sciences, Université Fouad I^er^, Abbassieh, au Caire.

1942 Habib (Abdallah), Professeur d'Histoire Naturelle à l'Ecole Secondaire Fouad I^er^, 2, Sharia El-Massoudi, Abbassieh, au Caire.

1936 Hafez (Mahmoud), Ph. D., Département d'Entomologie, Faculté des Sciences, Université Fouad I^er^, Abbassieh, au Caire.

1944 Hafez (Dr. Moustafa), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1938 Hamza (Soliman), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

» Hanna (Dr. Assaad Daoud), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 Hassan (Dr. Abbas Ibrahim), Département de Zoologie, Faculté des Sciences, Université Fouad I^er^, Ghizeh, près le Caire.

1928 Hassan (Dr. Ahmed Salem), Professeur de Zoologie et d'Entomologie à la Faculté d'Agriculture, Université Fouad I^er^, Sharia El-Madares, Ghizeh, près le Caire.

1944 Hassan (Mahrus Saleh), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1940 Hifnaoui Bey (Prof. Mahmoud Tewfik), Conseiller Technique du Ministère de l'Agriculture et Président de la Société Fouad I^er^ d'Entomologie, Sharia Lazogly, Hélouan, près le Caire.

1932 His Majesty Stationery Office, Princes Street, Westminster, S.W.1, London, Angleterre.

1924 Honoré (A.-M.), Dr. Sc., Phil., 2, Sharia Chebin, Heliopolis, près le Caire.

1927 Housny (Mahmoud), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1943 Hussein (Mohamed), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1938 Ibrahim (Abdel-Hamid Ibrahim), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1940 Ibrahim (Ahmed Housny), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 Imperial Chemical Industries (Egypt), S.A., Boîte Postale N° 1184, Alexandrie.

1936 Imperial Chemical Industries (Egypt), S.A., 26, Sharia Chérif Pacha, au Caire.

1928 Izzet Bey (Mohamed), 14, Midan El-Daher, au Caire.

1915 Jullien (Joseph), 215, Sharia de Thèbes, Cléopâtra-les-Bains, par Sidi-Gaber, Ramleh.

1927 Kamal (Dr. Mohamed), Sous-Directeur de la Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le le Caire.

1922 Kaourk (Elias A.), Avocat, c/o Egyptian Markets Company Ltd, 14, Sharia Emad El-Dine, au Caire.

1926 Kassem (Mohamed), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1943 Kefl (Ahmed Hassanein El-), Démonstrateur au Département d'Entomologie, Faculté d'Agriculture, Université Fouad I^er^, Sharia El-Madares, Ghizeh, près le Caire.

1938 Klein (Henry Z.), Agricultural Research Station, Boîte Postale N° 15, Rehovoth, Palestine.

1923 Laboratoires d'Hygiène Publique (Bibliothèque), Sharia El-Sultan Hussein, au Caire.

1931 Land Bank of Egypt (Monsieur l'Administrateur-Directeur), Boîte Postale N° 614, Alexandrie.

1944 Lean (Owen Bevan), Chief Locust Officer, c/o Middle East Supply Centre, G.H.Q., M.E.F., au Caire.

1934 Lotte (Dr. F.), Médecin de la Compagnie Universelle du Canal Maritime de Suez, Boîte Postale N° 222, Port-Saïd.

1931 Lycées Français (Monsieur le Proviseur), 2-4, Sharia Youssef El-Guindi, au Caire.

1932 Madwar (Dr. Saadallah Mohamed), Directeur de la Section Anti-Malaria, Ministère de l'Hygiène Publique, Sharia Meglis El-Nowab, au Caire.

1927 Mansour (Prof. Dr. Kamel), D. Sc., Département de Zoologie, Faculté des Sciences, Université Fouad I^er^, Abbassieh, au Caire.

1943 Milad (Dr. Anis Boutros), Entomologiste attaché à la Section de Pathologie Animale (Département Vétérinaire du Ministère de l'Agriculture), 1, Sharia Yacoub, El-Dawawine, au Caire.

1921 Mistikawy (Abdel-Megid El-), Sous-Directeur de la Section de Protection des Plantes, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1933 Mochi (Prof. Dr. Alberto), Villa i Sarici, Collina, presso Pistoia, Italie.

1944 Morcos (Georges), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1929 Mosseri (Dr. Henri), 25, Sharia El-Cheikh Aboul-Sebaa, au Caire.

1944 Moursi (Dr. Abdel-Fattah Aly), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1943 Nahal (Abdel-Kader Moustafa El-), Démonstrateur au Département d'Entomologie, Faculté d'Agriculture, Université Fouad I^er^, Sharia El-Madares, Ghizeh, près le Caire.

» Nakhla (Naguib), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 Nasr El-Sayed (Dr. Mahmoud), Microbiologiste aux Laboratoires Municipaux de Chimie et de Bactériologie, 8, Sharia Stanley Bay, Bulkeley, Ramleh.

1942 Okbi (Mahmoud Ismail El-), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 Palmoni (J.), Beth Gordon, Dagania A, P.O. Kinneret, Palestine.

1939 PANTOS (Jean G.), Ingénieur Agronome, Buta (Uele), Congo Belge.

1911 PETROFF (Alexandre), 27, Sharia Crafton, Bulkeley, Ramleh.

1944 PLANTA & C° (J.), Boîte Postale N° 450, Alexandrie.

1928 PRIESNER (Prof. Dr. H.), au Caire.

1942 RAWHY (Soheil Hussein), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1932 RIVNAY (E.), Agricultural Research Station, Boîte Postale N° 15, Rehovoth, Palestine.

1943 RIZKALLAH (Ramses), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1925 ROYAL ENTOMOLOGICAL SOCIETY OF LONDON (The), 41, Queen's Gate, South Kensington, S.W. 7, Londres, Angleterre.

1943 SAMAK (Mohamed Mohamed) Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1941 SAWAF (Saleh Kamel El-), Faculté d'Agriculture, Université Farouk I^er^, Damanhour, Basse-Egypte.

1936 SAYED (Dr. Mohamed Taher El-), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1938 SHAFIK Bey (Dr. Mohamed), Directeur Technique de la Société Financière et Industrielle d'Egypte, Post Office Bag, Kafr-Zayat, Basse-Egypte.

1924 SHAW (Fred), Northgate, Sherborne, Dorset, Angleterre.

1943 SHEHATA (Ahmed Mohamed El-Tabey), Démonstrateur au Département d'Entomologie, Faculté d'Agriculture, Université Fouad I^er^, Sharia El-Madares, Ghizeh, près le Caire.

1938 SOCIÉTÉ DU NAPHTE, S.A. (A.I. Mantacheff & Co.), 33, Sharia Chérif Pacha, au Caire.

1921 SOCIÉTÉ ROYALE D'AGRICULTURE, Laboratoire d'Entomologie de la Section Technique, Boîte Postale N° 63, au Caire.

1934 SOLIMAN (Prof. Dr. Hamed Seleem), Doyen de la Faculté d'Agriculture, Université Farouk I^er^, Damanhour, Basse-Egypte.

1928 SOLIMAN (Dr. Labib Boutros), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1926 TEWFIK (Mohamed), Conservateur des collections entomologiques de la Faculté des Sciences, Université Fouad I^er^, Abbassieh, au Caire.

1935 TRACTOR AND ENGINEERING COMPANY, S.A.E. (The), 18, Sharia Emad El-Dine, Boîte Postale N° 366, au Caire.

1926 Waly (Dr. Mohamed), Conférencier en Zoologie, Faculté des Sciences, Université Fouad I^er^, Abbassieh, au Caire.

1912 Wilkinson (Richard), Immeuble Baehler, 157, Sharia Fouad I^er^, Zamalek, au Caire.

1943 Zaki (Mikhaïl), Section d'Entomologie, Musée Agricole Fouad I^er^, Dokki (Ghizeh), près le Caire.

1944 Zervudachi (Emmanuel), Boîte Postale N° 1277, Alexandrie.

1938 Zoheiry (Mohamed Soliman El-), Directeur de la Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

Envois complimentaires

Bibliothèque du Cabinet de Sa Majesté le Roi, Palais d'Abdine, au Caire.

Bibliothèque privée de Sa Majesté le Roi, Palais d'Abdine, au Caire.

Son Altesse le Prince Omar Toussoun, Président de la Société Royale d'Agriculture, Boîte Postale N° 63, au Caire.

Son Excellence le Grand Chambellan de Sa Majesté le Roi, Palais d'Abdine, au Caire.

Son Excellence le Ministre de l'Agriculture, Dokki (Ghizeh), près le Caire.

Son Excellence le Ministre de l'Instruction Publique, Sharia El-Falaki, au Caire.

Monsieur l'Administrateur-Délégué du Crédit Foncier Egyptien, 35, Sharia El-Malika Farida, au Caire.

Son Excellence le Directeur-Délégué de la Société Générale des Sucreries et de la Raffinerie d'Egypte, 12, Sharia El-Cheikh Aboul-Sebaa (Boîte Postale N° 763), au Caire.

Son Excellence le Président du Conseil d'Administration de la Banque Misr, 151, Sharia Emad El-Dine, au Caire.

Monsieur le Directeur Général de l'Imperial Chemical Industries (Egypt), 26, Sharia Chérif Pacha, au Caire.

Monsieur le Directeur Général de la Société Financière et Industrielle d'Egypte, 2, Sharia Fouad I^er^, Alexandrie.

Son Excellence le Sous-Secrétaire d'Etat, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

Son Excellence le Secrétaire-Général du Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

Bibliothèque de l'Université Farouk I^er^, Alexandrie.

Son Excellence le Directeur du Cabinet Européen de Sa Majesté le Roi, Palais d'Abdine, au Caire.

Bibliothèque du Ministère de l'Instruction Publique, Sharia El-Falaki, au Caire.

Bibliothèque Egyptienne, Midan Bab El-Khalq, au Caire.

Bibliothèque du Musée Agricole Fouad I^er^, Dokki (Ghizeh), près le Caire.

Echanges

Afrique Occidentale Française

Institut Français d'Afrique Noire, Boîte Postale N° 206, Dakar.

Afrique du Sud

South African Museum, P.O. Box 61, Cape Town.

Department of Agriculture of the Union of South Africa (The Agricultural Journal of the Union of South Africa), Pretoria.

Department of Agriculture of the Union of South Africa, Division of Entomology, P.O. Box 513, Pretoria.

The Director, The Transvaal Museum, P.O. Box 413, Pretoria, South Africa.

The Honorary Secretary, Entomological Society of Southern Africa, P.O. Box 103, Pretoria.

Algérie

Société d'Histoire Naturelle de l'Afrique du Nord, Faculté des Sciences d'Alger, Alger.

Allemagne

Deutsche Entomologische Gesellschaft, 43, Invalidenstrasse, Berlin (IV).

Senckenbergischen Naturforschenden Gesellschaft, Bibliothek, Viktoria Allee 9, Frankfurt A/M.

Bücherei des Zoologischen Museums, 43, Invalidenstrasse, Berlin N 4.

Gesellschaft für Vorratsschutz E.V. (Mitteilungen der), 31, Zimmermannstrasse, Berlin-Steglitz.

Bücherei der Biologischen Reichsanstalt für Land- und Forstwirtschaft. 19, Königin-Luise-Str., Berlin-Dahlem.

Deutsches Entomologisches Institut der Kaiser Wilhelm Gesellschaft (Arbeiten über morphologische und taxonomische Entomologie, Arbeiten über physiologische und angewandte Entomologie), 20, Gossler Strasse, Berlin-Dahlem.

Deutsche Kolonial und Uebersee-Museum, Bahnhofsplatz, Brême.

Administration-Kanzlei des Naturhistorischen Museums, Burgring 7, Vienne (I).

Zoologisch-Botanische Gesellschaft, 2, Mechelgasse, Vienne (III).

Koleopterologische Rundschau, c/o Zoologisch-Botanische Gesellschaft. 2, Mechelgasse, Vienne (III).

Naturhistorischer Verein der Rheinlande und Westfalens (Entomologische Blätter, Decheniana), 4, Maarflach, Bonn.

Münchner Entomologischen Gesellschaft E.V. (Mitteilungen der), c/o Dr. W. Forster, 51, Neuhauser Strasse (Zoolog. Staatssamlg.), Munich (2).

Angleterre

The Imperial Institute of Entomology, Publication Office (Review of Applied Entomology, 41, Queen's Gate, London S.W. 7.

Zoological Museum (Novitates Zoologicæ), Tring Park, Tring, Herts.

The Apis Club (The Bee World), The Way's End, Foxton, Royston, Herts.

Cambridge Philosophical Society, New Museums, Free School Lane, Cambridge.

The Librarian, The Zoological Society of London, Zoological Gardens, Regent's Park, London, N.W.8.

The Librarian, Department of Entomology, University Museum, Oxford.

Argentine

Instituto Biologico de la Sociedad Rural Argentina, Buenos Aires.

Sociedad Cientifica Argentina, 1145, Calle Santa Fé, Buenos Aires.

Sociedad Entomologica Argentina, 665, Calle San Martin, Buenos Aires.

Museo Nacional de Historia Natural « Bernadino Rivadavia », Casilla de Correo N° 470, Buenos Aires.

Ministerio de Agricultura (Boletin del Ministerio de Agricultura de la Nacion), Bibliotheca, 974, Paseo Colon, Buenos Aires.

Australie

The Australian Museum (Records of the Australian Museum), Sydney, N.S.W.

The Entomologist's Office, Department of Agriculture, Sydney, N.S.W.

The Public Library, Museum, and Art Gallery of South Australia, Box 386 A, G.P.O., Adelaide, South Australia.

The Library of the Division of Economic Entomology, P.O. Box No. 109, Canberra City, F.C.T.

The Linnean Society of New South Wales, Science House, Gloucester and Essex Streets, Sydney, N.S.W.

Belgique

Société Entomologique de Belgique, Musée Royal d'Histoire Naturelle de Belgique, 31, Rue Vautier, Ixelles-Bruxelles.

Société Scientifique de Bruxelles, Secrétariat, 11, Rue des Récollets. Louvain.

Monsieur A. Moureau, Secrétaire du Bulletin de l'Institut Agronomique et des Stations de Recherches de Gembloux, Institut Agronomique de l'Etat, Gembloux.

Lambillionea, Revue Mensuelle de l'Union des Entomologistes Belges (M. F. Derenne), 123, Avenue de la Couronne, Ixelles (Bruxelles).

Annales du Musée du Congo Belge, Tervueren.

Association des Ingénieurs sortis de l'Institut Agronomique de l'Etat, à Gembloux, 35, Avenue des Volontaires, Anderghem-Bruxelles.

Brésil

Museu National do Rio de Janeiro, Rio de Janeiro.

Instituto Biologico, Bibliotheca, Caixa Postal 2821, São Paulo.

Instituto Oswaldo Cruz, Caixa de Correio 926, Rio de Janeiro.

Arquivos do Serviço Florestal, 1008, Jardim Botânico, Rio de Janeiro.

Academia Brasileira de Ciencias (Anais da Academia Brasileira de Ciencias), Caixa Postal 229, Rio de Janeiro.

Bulgarie

Institutions Royales d'Histoire Naturelle, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Entomologique de Bulgarie, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Bulgare des Sciences Naturelles, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Canada

Entomological Society of Ontario (The Canadian Entomologist & Reports), Guelph, Ontario.

Bibliothèque du Ministère Fédéral de l'Agriculture, Edifice de la Confédération, Ottawa.

Department of Agriculture, Entomological Branch, Ottawa.

Nova Scotian Institute of Science, Halifax.

Chine

The Lingnan Science Journal, Lingnan University, Canton.

Bulletin of the Biological Department, Science College, National Sun Yat-Sen University, Canton.

Bureau of Entomology of the Chekiang Province, West Lake, Hangchow.

Chypre

The Cyprus Agricultural Journal (The Office of the Governement Entomologist), Nicosia.

Colombie (République de), Amérique du Sud

Facultad Nacional de Agronomia (Biblioteca de la), Medellin.

Cuba

Sociedad Cubana de Historia Natural « Felipe Poey » (Memorias), c/o Dr. Carlos Guillermo Agnayo, 25 N° 254, Vedado, La Havane.

Danemark

Entomologisk Forening, Zoologisk Museum, Krystalgade, Copenhague.

Egypte

Ministère de l'Agriculture, Bibliothèque de la Section d'Entomologie, Dokki (Ghizeh), près le Caire.

Société Royale d'Agriculture, Bibliothèque de la Section Technique, Boîte Postale N° 63, au Caire.

Union des Agriculteurs d'Egypte, 25, Sharia El-Cheikh Aboul-Sebaa, au Caire.

The Bee Kingdom, 60, Sharia Menascé, Alexandrie.

Al-Fellaha, Boîte Postale N° 2047, au Caire.

Société Royale de Géographie d'Egypte, 45, Sharia El-Cheikh Youssef, au Caire.

The Journal of the Egyptian Medical Association, Kasr El-Aini Post Office, au Caire.

Société Fouad I^{er} d'Economie Politique, de Statistique et de Législation, Boîte Postale N° 732, au Caire.

Institut d'Egypte, 13, Sharia El-Sultan Hussein, au Caire.

Bibliothèque de la Faculté des Sciences, Université Fouad I^{er}, Abbassieh, au Caire.

Equateur (République de l'), Amérique du Sud

Director General de Agricultura (Revista del Departamento de Agricultura), Quito.

Boletin de la Seccion Agricola del Banco Hipotecario del Ecuador, Apartado 685, Quito.

Espagne

Instituto Nacional de 2ª Ensenanza de Valencia, Laboratorio de Hidrobiologia Espanola, Valencia.

Junta para ampliacion de Estudios e Investigaciones Cientificas, 4, Duque de Medinaceli, Madrid.

Junta de Ciencies Naturales de Barcelona, Museo Municipal, Barcelona.

Eos, Revista Espanola de Entomologia, Instituto Espanol de Entomologia, Palacio del Hipodroma, Madrid (VI).

Real Academia de Ciencias y Artes de Barcelona, 9, Rambla de los Estudios, Barcelona.

Sociedad Espanola de Historia Natural, Museo Nacional de Ciencias Naturales, Hipodromo, Madrid (VI).

Estacion de Patologia Vegetal, Instituto Nacional Agronomico, La Monclea, Madrid (VIII).

Etats-Unis

The Research Library, Buffalo Socicety of Natural Sciences, Buffalo Museum of Science, Humboldt Park, Buffalo, New-York.

University of Illinois Library, Exchange Division, Urbana, Illinois.

The Library, American Museum of Natural History, Central Park, West at 79th Street, New-York City.

Pacific Coast Entomological Society (The Pan-Pacific Entomologist), California Academy of Sciences, Golden Gate Park, San Francisco, California.

Academy of Natural Sciences, Entomological Section, Lagon Square, Philadelphia.

Experiment Station of the Hawaiian Sugar Planters' Association, P.O. Box 411, Honolulu, T.H., Hawai.

Hawaiian Entomological Society, c/o Experiment Station of the Hawaiian Sugar Planters' Association, P.O. Box 411, Honolulu, T.H., Hawai.

Carnegie Museum, Department of the Carnegie Institute, Pittsburgh, Pennsylvania.

American Entomological Society (The), 1900, Race Street, Philadelphia, Pa.

United States Department of Agriculture Library, Washington, D.C.

General Library, University of Michigan, Ann Arbor, Michigan.

United States National Museum, Smithsonian Institution, Washington, D.C.

Smithsonian Institution Library, Washington, D.C.

The Library, New-York State College of Agriculture and Agricultural Experiment Station, Cornell University, Ithaca, New-York.

New-York Academy of Sciences, New-York.

Pennsylvania State Health Department, Pennsylvania.

University of California Library, Berkeley, California.

University of California, Citrus Experimental Station Library, Riverside, California.

Wisconsin Academy of Sciences, Arts, and Letters, Madison, Wisconsin.

The Library, Minnesota Agricultural Experiment Station, University Farm, Saint Paul, Minnesota.

Museum of Comparative Zoology, Harward College, Cambridge, Mass.

The Philippine Agriculturist, Library, College of Agriculture, Agricultural College, Laguna, Philippine Islands.

Editorial Office, The American Midland Naturalist, University of Notre Dame, Notre Dame, Indiana.

Marine Biological Laboratory, Library, Woods Hole, Mass.

The Library, State College of Washington, Agricultural Experiment Station, Pullman, Washington.

Finlande

Societas Entomologica Helsingforsiensis (Notulae Entomologicae), Museum Zoologicum, Helsingfors.

Societas pro Fauna et Flora Fennica, Kaserngatan 24, Helsinki.

Societas Zoologica-Botanica Fennica Vanamo, Säätytalo, Snellmanstr. 9-11, Helsinki.

Société Entomologique de Finlande (Annales Entomologici Fennici), Institut de Zoologie Agricole et Forestière de l'Université, Snellmaninkatu 5, Helsinki.

France

L'Echange, Revue Linnéenne, Digoin (Saône et Loire).

Revue française d'Entomologie, Museum National d'Histoire Naturelle (Entomologie), 45 bis, Rue de Buffon, Paris (V^{e}).

Revue Scientifique du Bourbonnais et du Centre de la France, 22, Avenue Meunier, Moulins (Allier).

Société d'Etudes des Sciences Naturelles de Nîmes, 6, Quai de la Fontaine, Nîmes (Gard).

Société de Pathologie Végétale et d'Entomologie Agricole de France, Laboratoire de Pathologie Végétale, Institut National Agronomique, 16, Rue Claude Bernard, Paris (V^e^).

Société Linnéenne de Bordeaux, Athénée, 53, Rue Des Trois Conils. Bordeaux.

Société Linéenne de Lyon, 33. Rue Bossuet (Imm. Municipal), Lyon.

Société des Sciences Naturelles de l'Ouest de la France, Nantes (Loire Inférieure).

Association des Naturalistes de Levallois-Perret, 153, Rue du Président Wilson (Domaine de la Planchette), Levallois-Perret (Seine).

Société Linnéenne du Nord de la France, 81, Rue Lemerchier (M. Pauchet), Amiens.

Société Géologique de Normandie et des Amis du Museum du Havre, Hôtel des Société Savantes, 56, Rue Anatole France, Le Havre (Seine Inférieure).

Société d'Histoire Naturelle de Toulouse, Bibliothèque Universitaire de la Faculté de Médecine, Allée Saint-Michel, Toulouse.

Société Entomologique de France, Institut National Agronomique, 16, Rue Claude Bernard, Paris (V^e^).

Société d'Etudes Scientifiques de l'Aude, Carcassone (Aude).

Annales des Epiphyties et de Phytogénétique, Centre National des Recherches agronomiques, à Versailles, France.

Museum National d'Histoire Naturelle, Bibliothèque, 8, Rue de Buffon, Paris (V^e^).

Société de Zoologie Agricole (Revue de Zoologie Agricole et Appliquée), Faculté des Sciences, Institut de Zoologie, 40, Rue Lamartine, Talence (Gironde).

Grèce

Institut Phytopathologique Benaki, Kiphissia (près Athènes).

Bibliothèque de l'Institut et Musée Zoologique de l'Université, Athènes.

Hollande

Bibliotheek van der Nederlandsche Entomologische Vereeniging, p/a Bibliotheek van het Kolonial Instituut, 62, Mauritskade, Amsterdam.

Landbouwhoegeschool Laboratorium voor Entomologie, Berg 37, Wageningen.

Hongrie

Museum National Hongrois (Annales Historico-Naturales), 13, Barossutca, Budapest VIII.

Indes Anglaises

Zoological Survey of India (Records of the Indian Museum), Indian Museum, Calcutta.

Madras Governement Museum, Connemara Public Library, Egmore, Madras.

Office of the Director, Imperial Agricultural Research Institute, New Delhi.

Indes Néerlandaises

Den Directeur van's Lands Plantentium, Buitenzorg, Java.

Italie

Museo Civico di Storia Naturale « Giacomo Doria », 9, Via Brigata Liguria, Genova (102).

Rivista di Biologia Coloniale, 326, Viale Regina Margherita (Policlinico), Roma.

Museo Civico di Storia Naturale di Trieste (Atti del), 4, Piazza Hortis Trieste (10).

Società dei Naturalisti in Napoli, Reale Università, Via Mezzocannone, Napoli.

Società Entomologica Italiana, Museo Civico di Storia Naturale, 9, Via Brigata Liguria, Genova (102).

Società Adriatica di Scienze Naturali, 7, Via dell'Annunziata, Trieste.

La Reale Stazione di Entomologia Agraria (Redia), 19, Via Romana, Firenze (32).

La Reale Stazione Sperimentale di Gelsicoltura e Bachicoltura di Ascoli Piceno.

Istituto Zoologico della Reale Università di Napoli (Biblioteca del), Via Mezzocannone, Napoli.

Laboratorio di Zoologia Generale e Agraria del Reale Istituto Superiore Agrario in Portici, Portici (Napoli).

Reale Laboratorio di Entomologia Agraria di Portici (Bolletino del), Portici (Napoli).

Bibliothèque de l'Institut International d'Agriculture (Moniteur International de la Protection des Plantes), Villa Umberto I, Rome (110).

Società italiana di Scienze Naturali, Palazzo del Museo Civico di Storia Naturale, Corso Venezia, Milano.

Istituto di Zoologia della Reale Università di Genova (Bollettino dei Musei di Zoologia e di Anatomia comparata), 5, Via Balbi, Genova.

Società dei Naturalisti e Matematici di Modena, presso la Reale Università, Modena.

Istituto di Entomologia della Reale Università, 6, Via Filippo Re, Bologna (125).

Reale Accademia di Scienze, Lettere ed Arti in Padova, 15, Via Accademia, Padova (Veneto).

Museo di Storia Naturale della Venezia Tridentina (« Memorie del Museo di Storia Naturale della Venezia Tridentina » e « Studi Trentini di Scienze Naturali »), Casella Postale 95, Trento.

Reale Istituto Agronomico per l'Africa Italiana (L'Agricoltura Coloniale), Ministero dell'Africa Italiana, 9, Viale Principe Umberto, Firenze.

Istituto di Entomologia Agraria e Bachicoltura della Reale Università (Bolletino di Zoologia Agraria e Bachicoltura), 2, Via Celoria, Milano (133).

Società Veneziana di Storia Naturale (presso Sig. Antonio Giordani Soika), S. Marco 254, Venezia.

Japon

Saghalien Central Experiment Station, Konuma, Saghalien.

The Ohara Institute for Agricultural Research, Library, Kurashiki, Okayama-Ken.

Imperial Agricultural Experiment Station (Journal of the), Nishigahara, Tokyo.

Departement of Agriculture, Government Research Institute, Taihoku, Formosa.

The Kansai Entomological Society, c/o N. Tosawa, Shibakawa-Noen, Kotoen, Mukogun, Hyogo-ken.

« Mushii », Entomological Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka.

Takeuchi Entomological Laboratory (Tenthredo, Acta Entomologica), Shinomyia Yamashina, Kyoto.

Kenya Colony (British East Africa)

East Africa and Uganda Natural History Society, Coryndon Memorial Museum, P.O.Box 658, Nairobi.

Libye

Museo Libico di Storia Naturale, Piazza Santa Maria degli Angeli, Tripoli d'Africa.

Maroc

Société des Sciences Naturelles du Maroc, Institut Scientifique Chérifien, Avenue Biarnay, Rabat.

Défense des Végétaux, Service de l'Agriculture et de la Colonisation. Direction des Affaires Economiques, Rabat.

Mexique

Junta Nacional Directora de la Campana contra la Langosta (Junosta), Biblioteca, Departamento Directivo, Veracruz.

Biblioteca del Instituto Biotecnico, Calzada Mexico-Tacuba N° 295, Col. Anahuac, D.F.

Biblioteca del Instituto de Biologia, Chapultepec (Casa del Lago), Mexico, D.F.

Anales de la Escuela Nacional de Ciencias Biologicas, Apartado Postal 7016, Mexico, D.F.

Norvège

Tromso Museum Library, Tromso.

Panama (République de)

Departamento Seccional de Agricultura (Boletin Agricola), Panama.

Pologne

Musée Zoologique Polonais, Wilcza 64, Varsovie (1).

Société Polonaise des Entomologistes, Rutowskiego 18, Lwow.

Institut de Recherches des Forêts de l'Etat, Wawelska 54, Varsovie.

Portugal

Société Portugaise des Sciences Naturelles, Instituto de Fisiologia, Faculdade de Medicina, Lisbonne.

Museum Zoologique de l'Université de Coimbra, Largo Marquês de Plombal, Coimbra.

Associaçao da Filosofia Natural (Bibliotecario da), Faculdade de Ciencias, Porto.

Roumanie

Société Transylvanienne des Sciences Naturelles (Siebenbürgischer Verein für Naturwissenschaften), Hermannstadt, Sibiu.

Academia Romana, Bibliothèque, Calea Victoriei, 125, Bucarest.

Russie (U.S.S.R.)

Société Entomologique de Russie (Revue Russe d'Entomologie et Horae), Musée Zoologique de l'Académie des Sciences, Léningrad.

Bibliothèque de l'Académie des Sciences de l'Ukraine, 58a, Rue Korolenko, Kiew (Ukraine).

Société des Naturalistes de Kiew, 37-10, Rue Korolenko, Kiew (Ukraine).

Institut des Recherches Biologiques de l'Université de Perm, Perm II, Zaimka.

Institute for Plant Protection, Bureau of Applied Entomology and Zoology, Library, 10, Elagin Ostrov, Léningrad.

Rédaction du Journal « Plant Protection », 7, Rue Tschaikovsky, Leningrad.

Institute for controlling Pests and Diseases, Library, 7, Tschaikovsky Str., Leningrad 28.

Siam

Department of Agriculture and Fisheries, Entomology Section, Bangkok.

Suède

K. Swenska Vetenskapsakademien i Stockholm, Stockholm 50.

Entomologiska Foreningen, Brottninggatten 94, Stockholm.

Göteborgs Kungl. Vetenskaps-och Vitterhets Samhälles, Göteborg.

Statens Växtskyddsanstalt, Stockholm 19.

Bibliothèque de l'Université de Lund, Lund.

Suisse

Bibliothèque de la Société Entomologique Suisse, Musée d'Histoire Naturelle, Berne.

Zentralbibliotek, Naturforschenden Gesellschaft, Zurich.

Tchécoslovaquie

Societas Entomologica (Casopis), u Karlova 3, Prague II.

Section Entomologique du Musée National de Prague (Sbornik), Prague II-1700.

Bibliothèque de la Société Zoologique Tchécoslovaque, Institut de Zoologie, Karlov 3, Prague II.

Uruguay (République de l')

Escuela de Veterinaria del Uruguay (Anales de la Escuela de Veterinaria del Uruguay), Itazaingo 1461, Montévideo.

Sociedad de Biologia de Montevideo, Casilla de Correo 567, Montevideo.

Yougoslavie

Societas Entomologica Jugoslavica (Glasnik), 17, Garasaninovo ulica, Belgrade.

PROCÈS-VERBAUX DES RÉUNIONS

Réunion Amicale du 28 Janvier 1944

Présidence de Monsieur Mohamed Soliman El-Zoheiry,
Vice-Président

Comme chaque année, cette manifestation commémorative, destinée à perpétuer le souvenir de l'inauguration de notre Siége par le très regretté Roi Fouad Ier, a été empreinte d'un très sincère et cordial esprit de collaboration. Divers problèmes entomologiques y furent abordés et discutés.

Monsieur Mohamed Soliman El-Zoheiry a signalé une nouvelle affection qui s'est propagée ces dernières années dans les cultures d'haricots (*Phaseolus vulgaris* L.). Les feuilles de cette légumineuse sont minées par les larves d'un diptère Agromyzide (*Agromyza ?phaseoli* Coq.). Des pulvérisations au Volk, au moment ou les plants atteignent une hauteur d'environ quinze centimètres, sont recommandées pour la destruction de ces larves.

Son Excellence Fouad Abaza Pacha communique que les techniciens de la Société Royale d'Agriculture sont parvenus à réduire, à des proportions infimes, les dégâts causés aux cultures du bersim (*Trifolium alexandrinum* L.) par le ver de la feuille du cotonnier (*Prodenia litura* F.), et à celles du maïs par les chenilles de la *Sesamia cretica* Led.

Monsieur A. Alfieri rapporte qu'il a visité, en Septembre dernier, un vaste vignoble situé dans la Béhéra. La plupart des ceps étaient envahis par la fumagine (sooty mold fungus). Généralement, ce champignon ascomycète saprophyte fait son apparition sur les ceps infestés par les cochenilles ou par les aphides, se développant sur les sécrétions sucrées produites ou déposées sur les feuilles par ces insectes ; mais l'emploi des insecticides qui provoquent l'irritation des feuilles, ou bien un état morbide des ceps causé par des changements brusques de température, peuvent également constituer la cause directe ou indirecte du développement de la fumagine. Ici, il était évident que l'affection constatée avait comme origine les trop fréquentes pulvérisations à base d'arésine auxquelles les ceps avaient été soumis. En effet, ils étaient non seulement indemnes de cochenilles ou d'aphides, mais encore ne décelaient aucune trace d'infestation antérieure par ces insectes. Deux mois plus tard, quelques petites colonies sans importance de *Pseudococcus citri* Risso faisaient leur apparition ça et là dans le domaine sur les

feuilles des vignes. Monsieur ALFIERI est d'avis que le traitement préventif fut pire que le mal. Les insecticides ne devraient être appliqués qu'aux seuls ceps manifestement infestés par les cochenilles ou par les aphides, alors que le traitement d'hiver s'impose incontestablement.

Séance du 19 Février 1944

Présidence de Monsieur le Professeur H. C. EFFLATOUN Bey,
Vice-Président

Sont admis à faire partie de la Société en qualité de Membres Titulaires :

Monsieur EMMANUEL ZERVUDACHI, d'Alexandrie, et la DAIRA DRANEHT PACHA, présentés par Messieurs le Professeur H. C. EFFLATOUN Bey et A. ALFIERI ; Monsieur ALBERT ATALLAH et le Docteur ABBAS IBRAHIM HASSAN, de la Faculté des Sciences (Université Fouad I[er]), présentés par Messieurs le Professeur H. C. EFFLATOUN Bey et le Professeur Docteur KAMEL MANSOUR ; Messieurs J. PALMONI, de Dagania (Palestine) et le Docteur F. P. COYNE, présentés par Messieurs R. WILKINSON et A. ALFIERI ; Messieurs MAHRUS SALEH HASSAN et GEORGES MORCOS, de la Section d'Entomologie (Ministère de l'Agriculture), présentés par Messieurs MOHAMED SOLIMAN EL-ZOHEIRY et ANTOINE CASSAB ; Monsieur le Docteur MAHMOUD NASR EL-SAYED, des Laboratoires Municipaux d'Alexandrie, présenté par Messieurs le Docteur ASSAAD DAOUD HANNA et A. ALFIERI.

Subventions :

Le Secrétaire Général informe que la subvention de L.Eg. 400 du Ministère de l'Agriculture, pour l'année 1943, a été reçue à fin Janvier 1944.

Assemblée Générale Ordinaire :

Le Conseil approuve les termes des Rapports du Secrétaire Général, du Trésorier et des Censeurs destinés à être présentés à l'Assemblée Générale Ordinaire Annuelle dont la convocation est fixée au 22 Mars 1944.

Assemblée Générale Ordinaire du 22 Mars 1944

Présidence de Monsieur le Professeur H. C. Efflatoun Bey,
Vice-Président

Rapport du Secrétaire Général (exercice 1943) :

Messieurs,

Aux termes des Articles 24, 25 et 26 de nos Statuts, vous avez été convoqués en Assemblée Générale Ordinaire pour prendre connaissance des Rapports du Secrétaire Général, du Trésorier et des Censeurs sur la situation morale, financière et comptable de la Société, donner au Conseil décharge de sa gestion, et procéder, par voie d'élections, au remplacement des membres sortants du Conseil, ainsi que des deux Censeurs chargés de la vérification des comptes de l'Exercice en Cours.

Avant tout, rendons grâces à la Providence qui a entouré Sa Majesté le Roi Farouk Ier de Sa protection et qui a exaucé les ferventes prières de Son peuple en Lui accordant la santé.

Durant l'Exercice écoulé, notre contribution au développement intellectuel et scientifque du Pays a continué comme par le passé. Les spécialistes du Ministère de l'Agriculture, les professeurs et les étudiants des Facultés des Sciences, d'Agriculture et de Médecine Fouad Ier et Farouk Ier ont largement bénéficié de nos ressources scientifiques. .Nous leur avons fourni d'innombrables renseignements, références bibliographiques, et un nombre considérable de déterminations d'insectes. Des savants accompagnant les armées alliées en Egypte sont également venus se documenter à la Société. Leurs travaux seront incontestablement du plus haut intérêt pour le Pays, notamment ceux relatifs aux moustiques et plus spécialement à l'*Anopheles gambiae* Giles, au *Phlebotomus*, aux poux, puces et mouches, tous des insectes éminemment pernicieux à la santé publique.

Le vingt-septième volume de notre Bulletin vous a été récemment distribué. Il est largement illustré et contient les études suivantes :

Professeur F. S. Bodenheimer : La biologie de la *Coccinella septempunctata* L. dans quatre régions zoogéographiques différentes.

Docteur A.-M. Honoré : Nomenclature et Espèces-Types des Genres de Sphégides Paléarctiques.

Docteur E. Rivnay : L'efficacité du *Sympherobius amicus* Navas dans le contrôle du *Pseudococcus citri* Risso des aurantiacées en Palestine.

Monsieur J. Barbier : Notes sur quelques Coléoptères de la région d'Alexandrie.

Monsieur Antoine Cassab : Le régime alimentaire de la Courtilière.

Monsieur Abdalla Habib : La biologie et la bionomie de l'*Asterolecanium pustulans* Ckll.

Monsieur Mahmoud Hosny : Nouvelles Coccides pour l'Egypte et notes sur diverses autres espèces.

Docteur F. Lotte : Révision des Buprestides d'Egypte et du Sinaï (première partie).

Monsieur Mohamed Hussein : Un aperçu abrégé sur la propagation et le contrôle du criquet migrateur dans quelques régions de l'Arabie.

Les articles publiés par Messieurs Antoine Cassab, Mahmoud Hosny et Mohamed Hussein représentent la conclusion des travaux d'entomologie appliquée entrepris par ces spécialistes de la Section d'Entomologie du Ministère de l'Agriculture.

Nous avons fait parvenir à la Bibliothèque de l'Université Farouk I^er^, à titre de don, une collection complète de nos Bulletins et de nos Mémoires, soit trente-et-un volumes.

Notre Bibliothèque compte actuellement 14043 ouvrages, dûment enregistrés, contre 13845 l'année précédente.

Le nombre de nos membres est en augmentation. Nous enregistrons dix-huit nouvelles adhésions pour trois démissions.

Les donations reçues ont été les suivantes : Société Royale d'Agriculture, L.Eg. 50 ; Crédit Foncier Egyptien, L.Eg. 40 ; Banque Misr, L.Eg. 25 ; Société Générale des Sucreries et de la Raffinerie d'Egypte, L.Eg. 25 ; Imperial Chemical Industries, L.Eg. 25 ; Société Financière et Industrielle d'Egypte, L.Eg. 15. Nous réitérons l'expression de notre gratitude envers les Directions respectives de ces grandes institutions agricoles, financières et industrielles, et les remercions de la sollicitude et de l'intérêt qu'elles ne cessent de manifester à notre égard.

Une délégation du Ministère de l'Instruction Publique a inspecté notre organisation scientifique, administrative et financière. A la suite du rapport, entièrement favorable, qu'elle a rédigé, Son Excellence Taha Hussein Bey, contrôleur général de culture à l'Instruction Publique, nous a fait octroyer, par ce Ministère, une subvention de L.Eg. 100. Nous l'en remercions, ainsi que notre Vice-Président, Monsieur le Professeur Hassan Chaker Efflatoun Bey pour ses démarches à cet effet.

Au 31 Décembre, date de clôture de nos comptes, nous n'avions pas encore reçu la subvention annuelle du Ministère de l'Agriculture. Nos prévisions budgétaires en ont été troublées et le déficit de L.Eg. 283.511 a dû être comblé par un prélèvement sur le capital social.

Nous devons à la vigilance et au dévouement sans pareil de notre Trésorier, Monsieur Richard Wilkinson, ainsi qu'aux efforts incessants de tous les membres de notre Conseil d'Administration, d'avoir jusqu'ici conservé intact notre patrimoine initial. Cependant, les perspectives ne sont guère encourageantes. Le coût de la vie continue sa courbe ascendante, les frais d'impression, de clichage et autres, sont élevés. Nos ressources, qui étaient encore de L.Eg. 1600 en 1934, ne sont plus que de L.Eg. 1370 par suite de la réduction du taux des intérêts bancaires et de celui de nos titres. Nos dépenses à venir atteindront L.Eg. 1870. Notre déficit annuel sera ainsi de L.Eg. 500, et nous serons contraints à nouveau d'avoir recours à notre capital, faute de nouvelles ressources.

Votre Trésorier a établi le Bilan des Comptes de l'Exercice, dûment vérifié et approuvé par vos Censeurs, ainsi que les Prévisions Budgétaires pour l'Exercice 1944.

Aux termes de l'Article 13 de nos Statuts, le Conseil est annuellement renouvelé par tiers. Les membres sortants, cette année, sont les suivants : Messieurs le Professeur Hassan Chaker Efflatoun Bey, le Professeur Docteur Kamel Mansour, le Docteur Mohamed Saadallah Madwar et A. Alfieri. Ils sont rééligibles.

Vos Censeurs, Messieurs le Docteur A. Azadian et E.A. Kaourk, sont également rééligibles.

Nous terminons ce Rapport en dédiant nos respectueuses pensées à Sa Majesté le Roi Farouk Ier, et Lui exprimons nos sentiments de profond dévouement et nos vœux les plus fervents.

Signé : A. Alfieri

Rapport du Trésorier :

Situation au 31 Décembre 1943

Doit	L.E.	MM.	**Avoir**	L.E.	MM.
Bâtiment (pour mémoire)	1	000	Réserve Générale	15527	292
Mobilier »	1	000	Subvention du Ministère de l'Instruction Publique	99	795
Bibliothèque »	1	000	Donations diverses	180	000
Collections »	1	000	Coupons	644	642
Laboratoire »	1	000	Intérêts	24	860
Portefeuille Titres	13187	630	Cotisations	83	985
Banque Nationale d'Egypte	2016	552	Droits d'Inscriptions	3	600
Compagnie du Gaz	4	629	Mobilier	2	500
Appointements et allocations de vie chère	815	400	Vente Publications	3	125
Publications	281	450			
Frais Généraux et Entretien...	154	523			
Impôts et Assurances	74	645			
	16569	799		16569	799

Inventaire

Actif			**Passif**		
Bâtiment (pour mémoire)	1	000	Réserve Générale	15243	781
Mobilier »	1	000			
Bibliothèque »	1	000			
Collections »	1	000			
Laboratoire »	1	000			
Portefeuille Titres	13187	630			
Banque Nationale d'Egypte	2046	522			
Compagnie du Gaz.....	4	629			
	15243	781		15243	781

Portefeuille Titres en dépôt à la Banque Nationale d'Egypte :

11400 L.Eg. Emprunt National 3 ¼ % (1963-1973).
6700 £ Dette Privilégiée Egyptienne 3 ½ % (en voie de conversion).

Signé : R. WILKINSON

Rapport des Censeurs :

En exécution du mandat que vous avez bien voulu nous confier, nous avons l'honneur de porter à votre connaissance que nous avons vérifié les Comptes de la Société Fouad I^er^ d'Entomologie pour l'année finissant le 31 Décembre 1943 avec les registres et documents y relatifs.

Nous certifions que le Bilan reflète d'une façon exacte et sincère la situation de la Société telle qu'elle ressort des registres et des explications qui nous ont été données.

Signé : Dr. A. Azadian et E. Kaourk

Prévisions Budgétaires pour l'année 1944 :

Recettes			**Dépenses**		
	L.E.	MM.		L.E.	MM.
Subvention du Ministère de l'Agriculture	400	000	Publications	600	000
Subvention du Ministère de l'Instruction Publique	100	000	Appointements et allocations de vie chère	970	000
Donations	180	000	Frais Généraux	160	000
Coupons	585	000	Impôts	48	000
Cotisations	80	000	Assurances	27	000
Intérêts	20	000	Abonnements Bibliothèque	4	000
Vente Publications	5	000	Entretien	30	000
Prélèvement sur capital	500	000	Loyer	1	000
			Imprévus	30	000
	1870	000		1870	000

Signé : R. Wilkinson

Décisions :

1° L'Assemblée Générale Ordinaire approuve les Rapports du Secrétaire Général, du Trésorier et des Censeurs et donne décharge au Conseil de sa gestion pour l'exercice 1943.

2° Sur la proposition du Président, l'Assemblée adopte une motion de remerciements en faveur des Membres du Conseil, du Secrétaire Général, du Trésorier et des Censeurs pour leur précieuse collaboration et leur constante activité durant l'exercice écoulé.

Elections :

Messieurs le Professeur Hassan Chaker Efflatoun Bey, le Professeur Docteur Kamel Mansour, le Docteur Mohamed Saadallah Madwar et Anastase Alfieri, Membres du Conseil sortants, sont réélus.

Messieurs le Docteur A. Azadian et E. Kaourk sont réélus aux fonctions de Censeurs des Comptes de la Société.

Séance du 8 Avril 1944

Présidence de S.E. le Prof. Tewfik Hifnaoui Bey, *Président*

Donations :

La Société Générale des Sucreries et de la Raffinerie d'Egypte et la Banque Misr ont fait parvenir leur donation annuelle de L.Eg. 25 respectivement.

Le Conseil remercie.

Admission de Membres :

Sur la proposition de Messieurs le Professeur H. C. Efflatoun Bey et A. Alfieri, l'Imperial Chemical Industries (Branche d'Alexandrie), est admise à faire partie de la Société en qualité de Membre Titulaire.

Bureau du Conseil pour l'Exercice 1944 :

Sont réélus : Messieurs le Professeur H. C. Efflatoun Bey et Mohamed Soliman El-Zoheiry, *Vice-Présidents ;* Monsieur Anastase Alfieri, *Secrétaire Général ;* Monsieur Richard Wilkinson, *Trésorier.*

Comité Scientifique pour l'Exercice 1944 :

Sont réélus : Messieurs le Professeur H. C. Efflatoun Bey, Mohamed Soliman El-Zoheiry, le Professeur Docteur Kamel Mansour, le Professeur Docteur Hamed Seleem Soliman, le Docteur Saadallah Mohamed Madwar, le Docteur Assaad Daoud Hanna, et Anastase Alfieri.

Commémoration du Huitième Anniversaire de la mort du Roi Fouad Ier

Le 28 Avril 1944, la Société Fouad Ier d'Entomologie commémorait le Huitième Anniversaire de la mort du Très Regretté Roi Fouad Ier.

LA VISITE DE SA MAJESTÉ LE ROI FAROUK Ier A LA SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

Le Souverain au Musée d'Entomologie

Sa Majesté s'intéressant aux lichens d'Egypte

Ce jour-là, tôt dans la matinée, la Société déposa une couronne dans le mausolée du Roi Savant. A midi, les Membres du Conseil se rendirent à la Mosquée de Rifaï et s'inclinèrent devant la tombe du Haut Protecteur et Grand Bienfaiteur de la Société. Ils s'inclinèrent également devant Sa Majesté le Roi FAROUK Ier, noble exemple de piété filiale, pieusement venu se recueillir devant la tombe de Son Père. Dans l'après-midi, au Siège de la Société, Son Excellence le Professeur MAHMOUD TEWFIK HIFNAOUI Bey prononça une allocution retraçant la grande œuvre de renaissance scientifique et intellectuelle entreprise par le Roi défunt.

Conférence du 28 Avril 1944

Monsieur le Docteur ASSAAD DAOUD HANNA : Recherches sur le traitement de la mouche des fruits (en anglais).

Visite de Sa Majesté le Roi Farouk Ier

Le mercredi 17 Mai 1944, Sa Majesté le Roi FAROUK Ier honorait de Sa visite le Siège de la Société.

L'Auguste Souverain fut reçu par Son Excellence le Président et les Membres du Conseil de la Société au complet.

Sa Majesté s'intéressa vivement aux collections entomologiques, botaniques et ornithologiques, ainsi qu'aux laboratoires et à la bibliothèque, et manifesta Sa Haute satisfaction.

Avant de se retirer, Sa Majesté apposa Sa signature sur le Livre d'Or de la Société.

A l'issue de la visite Royale, Son Excellence le Président et les Membres du Conseil se rendirent au Palais d'Abdine et s'inscrirent sur les régistres en signe de gratitude et de dévouement.

A l'occasion de Sa visite, Sa Majesté fit à la Société un don de L.Eg. 500, qui fut suivi par l'envoi de cinq spécimens ornithologiques naturalisés d'espèces rarissimes, d'une brochure destinée à la bibliothèque, et de 29 espèces d'insectes qui n'étaient pas représentés dans nos collections. Les détails relatifs à ces donations sont consignés dans le Régistre des Procès-Verbaux de la Société.

Conférence du 12 Juillet 1944

Monsieur le Docteur ABDEL FATTAH ALY MOURSI : Le contrôle biologique des Insectes (en anglais).

Conférence du 18 Octobre 1944

Monsieur le Docteur ABDEL AZIZ EL-SAYED GHABN : *Thrips tabaci* Lind., sa biologie et son contrôle par les méthodes culturales (en arabe).

Conférence du 2 Décembre 1944

Monsieur Mohamed Hussein : Récentes observations scientifiques en Arabie (en arabe).

Séance du 20 Décembre 1944

Présidence de M. le Prof. H. C. Efflatoun Bey, *Vice-Président.*

Donations :

La Société a reçu L.Eg. 25 de l'Imperial Chemical Industries, L.Eg. 50 de la Société Royale d'Agriculture, L.Eg. 50 du Crédit Foncier Egyptien.

Le Conseil remercie.

Dons à la Bibliothèque :

Monsieur le Docteur A.-M. Honoré a fait parvenir 51 ouvrages et brochures relatifs aux Hyménoptères Aculéates (numéros d'enregistrement : 14171, 14172, 14230-14278).

Monsieur le Docteur B. P. Uvarov adresse 4 brochures sur les Orthoptères (numéros du régistre : 14279-14282).

Le Conseil remercie ces généreux donateurs.

Dons d'Insectes :

Monsieur le Docteur A.-M. Honoré fait don d'un lot d'environ 700 insectes d'Egypte, principalement des Hyménoptères Aculéates.

Le Conseil remercie.

Admission de Membres :

Sont admis à faire partie de la Société en qualité de Membres Titulaires : Messieurs les Docteurs Abdel Fattah Aly Moursi et Moustafa Hafez, de la Section Entomologique du Ministère de l'Agriculture, présentés par Messieurs Mohamed Soliman El-Zoheiry et le Docteur Assaad Daoud Hanna ; la Faculté d'Agriculture Farouk I^er^, Messieurs J. Planta & Co., d'Alexandrie, présentés par Messieurs Richard Wilkinson et A. Alfieri ; Monsieur Owen Bevan Lean, chef du Département des Sauterelles du M.E.S.C., présenté par Messieurs Mohamed Soliman El-Zoheiry et A. Alfieri ; Monsieur T. W. Brown, horticulteur, présenté par Messieurs le Professeur H. C. Efflatoun Bey et A. Alfieri.

The Desert Locust (*Schistocerca gregaria* Forsk.) movements in South-West Arabia

[Orthoptera-Acridinae]

(with Map)

by Mohamed Tewfik,
Curator of the Entomological Collections
of the Faculty of Science, Fouad I University.

INTRODUCTION

Very little is known concerning the movements of the Desert Locust in that remote part of South-West Arabia. In 1936, the present writer, who was a member of the Egyptian University Scientific Expedition to Yaman and Hadhramaut, collected there some useful information on the subject. Most of it was supplied by reliable persons, such as personalities and educated men inhabiting the regions visited. It was rather difficult to draw any information from the ordinary country-men, and the investigator had to be very patient and careful in considering their statements, and able to apply psychological methods with them, otherwise he would have been completely misled. Through the information collected, it is possible to give, to a certain extent, a general idea and useful comments regarding the breeding places, the seasons and directions of migrations of the Desert Locust as they occur in that region of Arabia.

Dr. S. A. Huzayyin, geographer, and at present the Director of the Egyptian Institute in London, was the leader of the Expedition. His meteorological records during the journey, from April to October 1936, are of great value in relation to the Desert Locust bionomics and other problems. The author is indebted to him for the concise note supplied on the climate of South-West Arabia, and which is published as Appendix at the end of this paper.

It was not the intention of the author to publish these notes until much wider investigation has been made. However, urged by Dr. B. P. Uvarov, who visited Cairo in July 1943 to attend the Anti-Locust Conference held by the Middle-East Supply Centre, the author was persuaded to send them to print in their original form.

I. RECORDS FROM YAMAN

On *19th April*, at Lahj (140 m.), Al-Sayed Mohamed Mahboub stated :

« The locusts come in summer (1), often from North-West or West. They are called *Tihami* (derived from Tihamah, the Yaman plain). Their colour is usually reddish. Swarms may again come from North, but in autumn. The first swarms migrate to the inlands of Hadhramaut after feeding, and rarely lay eggs. The second group, after feeding and mostly laying eggs, migrates either to Sheikh Said (the farthest village at the boundary of Yaman close to the Adan Protectorate) or to the sea ».

In my opinion, the north-western migration originates from the Ta'iz highlands and the western one from Tihamah. Migration from the North comes from Beihan, and is affected by the northerly winds prevailing in autumn. Egg-laying occurs in summer as well as in autumn, but mostly after the latter migration. This is probably due to the excess of rain water flowing from the interior highlands into this area in August, and which keeps longer in the soil. It is unknown if the swarms that migrate to Sheikh Said cross the Red Sea at its narrowest part (Strait of Bab El-Mandab) and reach Eritrea, or if they lay eggs and hibernate on the spot during the winter season, to proceed northwardly in the Tihamah about the end of the spring. The swarms migrating towards the Arab Sea either vanish or cross safely to British Somaliland.

Lahj distirct is rich in alluvial deposits brought by rain from the highlands of Yaman through Wadi Tiban. It is also under fairly good cultivation, and therefore a suitable area for the breeding of locust offspring.

Regarding the word *Tihami* used by the inhabitants to designate the locust, a term which will be frequently met with as later information is given, it does not always refer to the *Tihamah* locality, because swarms may have crossed the Red Sea from East Africa or other direction.

On *22nd April*, at Ta'iz (1300 m.), H.H. Prince Aly Ibn El-Wazir of Ta'iz Province stated :

« The locust invasions occur usually either from North-East, or South-West and West. Swarms coming from North-East reach us in August and

(1) Seasons in Yaman run as follows: Spring = March-May; Summer = June-August; Autumn = September-November; and Winter = December-February.

September, and migrate towards the Red Sea. Swarms originating from South-West and West are more extensive; they occur in May and June and migrate to the Dthamar Province. Crops in Ta'iz are very much affected by the Desert Locust. The latest invasion took place three years ago, and was less troublesome than the previous one which occurred three years before. Both came from South-West and were directed towards North-East. Egg-laying occurs in the Ta'iz district, mainly on the lower slopes of hills, the surrounding wadis, and the neighbouring plains of Hizran, etc. ».

Undoubtedly, the locusts arriving from the North-East originate from Beihan, while those coming from the South-West and West probably proceed either from the extreme southern Tihamah or very likely from Eritrea and Abyssinia. Locusts migrating towards the Red Sea may cross again to Eritrea. Migrations to Dthamar may either deviate north-easterly to Beihan and from there to the interior of Hadhramaut, or continue northwardly to Nadjran and the wadis in between, east to the highlands, and at the border of Al-Rob' Al-Khali. The fact that south-western winds are almost prevailing at the beginning of the summer, and also that strong north-eastern winds blow in August, strengthens the writer's conclusion above given.

Ta'iz district is exceedingly rich in vegetation. Its mountains are cultivated nearly up to the peaks through a system of terraces (stairs-like). The main agricultural production is « Qat » (*Catha edulis*). Other crops are coffee, wheat, barley, potatoes, sweet potatoes, tomatoes, onions, carrots, beans, ochra, grapes, apricots, peaches, apples, figs, prickly figs, plums, and citrus. Wild plants as *Euphorbia* cover the mountains with a conspicuous green mantle noticeable from very far away. Other commonest wild plants are *Mentha, Ruta, Ocimum,* and *Gladiolus.*

On *29th April,* at Al-Turbah (1840 m.), Al-Qadi Hussein Al-Halali, superintendent of the Hudjariah Province and one of the most important personalities in Yaman, stated as follows :

« The dangerous migratory locust invades this district every seven years. The locusts settle in the country for seven years and disappear for another seven. Invasion occurs usually in July and August, proceeding from a northern or southern direction ».

Other inhabitants continued Al-Qadi Hussein Al-Halali's statement by adding :

« In April and May, the locust again comes in lesser swarms from East to West. More numerous swarms — like clouds — reach here in June from the West and proceed to the East. These swarms are more dangerous to cultivation than the eastern ones, because they remain longer in the district. Neither invasion has any fixed time, but may be expected every three or four years ».

Al-Qadi Hussein Al-Halali's information that invasion occurs every seven years is of much interest, and should be kept in mind further on when reaching the paragraph concerning San'aa.

The migrations tending either in a southerly or westerly direction, may reach British Somaliland and Eritrea respectively, with the exception of some swarms which perish in the sea; or again in an easterly direction, to Lahj district, as well as to the farthest wadis of Adan Protectorate, and to the interior of Hadhramaut. The directions of these migrations seem to be largely correct in relation with the wind in early summer, which blows westerly, south-westerly, southerly, and south-easterly.

Hudjariah Province is to be considered as one of the main agricultural regions in Yaman. Its flora is about similar to that of Ta'iz, with the exception of a few plots of sugar-cane and date trees growing in the lower wadis between Ta'iz and Al-Turbah.

On *2nd* and *3rd May*, several wadis and mountains North-East of Al-Turbah region were explored, namely Djabal Halqan, Djabal Zalgomal, Djabal El-Showar, Djabal Mataran, and Djabal Dthubhan. Here the altitude is higher than at Al-Turbah, and reaches 2250 metres at Al-Sowayarah village. The weather is much colder and subject to excessive rain and hail, which as a matter of fact fell for about one hour on the first day at 11.50 a.m. Here again, the flora is about the same as at Al-Turbah. Information concerning the Desert Locust was collected from Al-Sayed Mohamed Abdallah and other persons at Al-Turbah.

On *7th May*, at Makha (7 m., Red Sea shore), Al-Sayed Mohamed Abd El-Rahman Al-Megahed, governor of Makha, stated :

« The invasions have no definite time, and their directions cannot be ascertained. It may be said that they occur between April and June. A swarm crossed Makha in June last year, coming from the sea. Three years before (1932), a swarm came and left in the same direction, in May and June as far I recollect. Occasional information received states that such swarms never rest at Makha, but usually at Wadi Al-Orayesh. It also occurs often that swarms coming from the East may turn in a northerly direction or make for the sea. The swarms arrive mostly before sunset, settle for a night only and proceed again in the forenoon the next day ».

Makha itself is in ruins, and the inhabitants have deserted it to settle at Hodeidah and Adan. Its neighbourhoods are marshy or sandy. The flora is poor and mostly represented by *Zygophyllum*. Makha, therefore, is to be considered only as a halting place for locust. Wadi Al-Orayesh, East of Makha, is under perennial irrigation, and grows maize, banana, dome and date trees, papaw, etc. It may be considered as a suitable place for landing and also for the breeding of locust.

On *9th May*, at Heis (220 m.), Al-Sayed Aly Ibn Mohamed No'man, superintendent of Heis stated :

« The locust reaches this region every 3-4 years from the South-East, usually in May, and causes great damage to cultivation. Eggs are laid and hoppers emerge. The migraton proceeds North or North-West, and West. Sometimes a few swarms proceeding from Wadi Nakhlah reach here during the autumn ».

At Wadi Nakhlah was met for the first time a moderate number of the gregarious phasis of *Schistocerca gregaria* Forsk.. No egg-masses were found.

Though it was not mentioned at Ta'iz that locusts migrate north westerly, it may be assumed that the information of its westward migration from Ta'iz is also correct. This can be explained by the fact that part of the swarms proceeding from Ta'iz to the West may deviate to North-West, for exaxmple to Heis. Migration from Heis to North or North-West, undoubtedly reaches Zabeed and the rest of the Tihamah. Those migrating towards the West, either perish in the Red Sea, or cross to Eritrea. In my opinion, the locust reported as visiting Heis in autumn from Wadi Nakhlah, proceeded from Beihan to the great Wadi Zabeed and from there to Heis. Wadi Zabeed extends into the interior up to the highlands.

Heis stands at the junction of Wadi Nakhlah to the great Wadi Sowirah, and is under moderate cultivation. It represents a great centre in southern Yaman for the wood trade of the *Acacia* trees which grow abundantly near Al-Djerrahi village North of Heis.

On *10th May*, at Zabeed (170 m.), Al-Sayed Abdallah Maghal, secretary to the superintendent of Zabeed, said :

« The locust invades Zabeed every 3-4 years in May and June. Usually they come from Heis, lay eggs and migrate northward in the Tihamah. Other swarms proceeding from the North-East reach in September, lay eggs and migrate sometimes northerly towards Hodeidah, and frequently westerly towards the Red Sea, or southerly also along the Tihamah ».

To my opinion, it is almost certain that the locust invasions from the North-East over Zabeed proceeded from Beihan. The swarms are carried through the Wadi Zabeed by the strong North-North-East winds prevailing in September.

Zabeed is situated on the great Wadi of its name. Its agricultural area covers a wide range and produces many of the common crops and fruit trees, namely : maize, dukhn, cotton, sesame, indigo, Jew's mallow, grapes, lemons, custard, papaw, mangoes, etc. Other wild plants are *Panicum* and *Datura*. The abundance of indigo has led to the dying industries, which are concentrated at Zabeed. Cotton reaches up to three metres in height, its

fibre is of very poor spinning value and is used mostly to stuff mattrasses and pillows.

On *11th May*, at Beit Al-Faqeeh (180 m.), the following statement was supplied by Al-Sayed Mohamed Ibn Ismail, superintendent of Beit Al-Faqeeh :

« Here, the locust invasions occur every 3-4 years, in May and June. The swarms come from Zabeed and migrate towards Hodeidah after feeding and egg-laying. Swarms also come from eastward in August and September. They may lay eggs and then migrate over the Red Sea. Occasionally, it happens that a few swarms come at the same time in August and September, proceeding from northward and directed southwardly. Such swarms are not strong in number ».

It is worthy of notice that the south-easterly or South migrations on Heis and Zabeed previously stated, as well as those on Beit Al-Faqeeh, occur almost nearly at the same time. This induces the writer to consider such migrations as being made by a single swarm that laid eggs in Heis, flew to Zabeed where eggs were laid again, and reached Beit Al-Faqeeh to lay once more. The swarm may again be noticed at Hodeidah and further on northwards.

Locust arriving from the East to Beit Al-Faqeeh may proceed from Beihan.

A popular statement, that swarms coming from the northerly direction proceed from the Tihamah of Aseer, passing through Hodeidah, needs confirmation. However, this information is likely to be correct. On the other hand, the swarms may also come from the East (for example Beihan) to Wadi Anis from where they proceed to Wadi Al-Ghadeer and they apparently invade Beit Al-Faqeeh from the North.

Beit Al-Faqeeh is under the same agricultural conditions reported for Zabeed.

On *13th* and *14th May*, at Hodeidah (10 m., Red Sea shore), Al-Sayed Naguib Aly Madhir, brigadier of H.H. the Prince's Quarter, Al-Qadi Abdallah Al-Hadid, and Al-Qadi Mohamed Al-Sorami, who were appointed by H.H. the Prince of Hodeidah to accompany our expedition, gave he following information :

« The locust invasions have no fixed periods, but may occur more or less every 4 years from all directions, mostly in summer and autumn. The summer swarms are usually dense, and come from the West and the South ; the autumn swarms reach here from the North and the East. Individuals of both swarms are reddish. Egg-laying never occurs at Hodeidah, but only several kilometers inwardly ».

Swarms coming from the West are certainly proceeding from Eritrea or further westwardly (northern Abyssinia and Anglo-Egyptian Sudan) and are directed towards the plateau East of Tihamah. Those arriving from the South come along the Tihamah and move to the northern Tihamah of Yaman and Aseer. The migration from the North is derived from Aseer, and continues southwardly along the Yaman Tihamah up to the Strait of Bab El-Mandab from where it may cross the sea to French or British Somaliland. The eastern swarms may come from Beihan through Wadi Siham. It may be noted here that the western migrations coming across the Red Sea and which invade Hodeidah and further South in the Tihamah at Makha only, are not reported at Heis, Zabeed and Beit Al-Faqeeh.

Hodeidah is not under cultivation, but South of it, at Al-Ha'et of Al-Dorayhemi, crops and many date trees are to be found. Mangrove grows between Hodeidah and Al-Dorayhemi. The flora in this coastal area is represented by *Zygophyllum* and *Panicum*.

On *15th May*, the expedition left Hodeidah for San'aa, via Ma'bar. Dusty and salty soft sand were mostly met with when it crossed the Tihamah, while the flora is only *Zygophyllum* and *Panicum*. The foot of the interior plateau was reached at Badjil (190 m.). Here, plenty of maize grows in the water beds running from the highlands. The soil is of alluvial and sandy nature. The next halt occurred at Al-Biheih (310 m.), where the agricultural conditions are similar to that of Badjil.

At Al-Biheih, Al-Qadi Yahia Hasan Al-Showkani stated :

« Locusts usually lay eggs in the region between Badjil and Ubal ».

Further information concerning the locust movements was obtained from him and other inhabitants, but it is not recorded here as it does not differ from what was previously stated at Hodeidah. Apparently, two or three annual rotations of maize and millet occur in the region.

On *16th May*, the expedition crossed Ubal (494 m.), and Wadi Siham, where the inhabitants stated :

« The locust lay eggs in the valley ».

As for the direction of the locust movements, it remains the same as recorded from Hodeidah.

Wadi Siham is fairly wide and long. Water runs for about seven and half kilometers on a bed of fine gravel and alluvium. Its vegetation is extensive, especially the coffee. After Wadi Siham, the plateau is reached.

At Madinat Al-Abeed (1180 m.), Al-Qadi Abd El-Rahman Soweid, gave the following information :

« The locust invades Madinat Al-Abeed about every four years. In summer, the swarms come from the South and from the Tihamah, and from

Qa' Djahran (Qa' = depression, therefore the depression of Djahran) and Ma'bar (North-East) in autumn. The summer migrations usually proceed towards Qa' Djahran and Ma'bar, the autumn ones towards Tihamah and Wadi Raima (South-West). Swarms rarely lay eggs at Madinat Al-Abeed or in Qa' Djahran during the autumn. If any hoppers emerge, they are killed by rain and cold weather ».

The fact that the above information does not mention the northerly direction either in the case of invasion or in the case of migration, may be explained as follows : Both localities are at a high altitude, and fall at the head of a narrow angle between East and North directions ; hence, it is rather difficult to record any definite direction, though such may be East, or North, and swarms settle at Qa' Djahran during the summer as it will be seen later on.

On *17th May*, Al-Hammam village (2250 m.), where a source of hot water (47.4° C.) occurs, was reached, and then Ma'bar which is situated at the same altitude (2250 m.). Here, the superintendent of Qa' Djahran, Al-Qadi Fadl Ibn Aly Al-Akwa, mentioned the following :

« Swarms come from every direction. When they come from the North in June and July, they proceed to the South. Those coming from the South and West again in June and July, migrate to the North and West. Locusts arriving in August come from the East and are directed towards the West. The less dangerous swarms are those coming from the North and East. They stay but very little in the district, or again the northern ones may occasionally settle during the summer. Migrations reaching from the South and West are substantial and very harmful to crops. These settle definitely, the earlier swarms lay eggs, hoppers hatch, adults migrate, and the region is free again when the winter comes. Migrations have no fixed period, but are to be expected more or less every four years. The migration which occurred in 1935 came from the West ».

The depression of Djahran (Qa' Djahran) covers an area of 200 square kilometers, and is under cereal cultivation depeding on a few wells and on rain. The nature of the soil is entirely alluvial.

On *15th June*, the depression of Sahman (Qa' Sahman, 2495 m.), North of Djabal Aser and East of Djabal Al-Nabi Shu'eib, Al-Matnah (2780 m.) and Beit Moftah (3157 m.) were visited.

On *16th June*, Al-Qaher (3525 m.), the highest of the five peaks of Djabal Al-Nabi Shu'eib was reached, and descended through Wadi Al-Qariah (2860 m.).

According to the inhabitants, the following statement was given :

« The locality is rarely invaded by locusts, but when migrations take

place, they occur only during the early summer, and the swarms come from the North-East and West ».

At Beit Moftah, Al-Sayed Yahia Ibn Ahmed stated :

« The locust does not come to this mountainous area where a fall of temperature occurs in summer, and the winter is exceedingly cold ».

Other information from the inhabitants, at Beit Moftah, was :

« Here, during the winter, it snows in large flakes. A layer of snow of about 1-2 fingers thick covers the whole region from the evening to the morning. The water freezes in the basins. When the weather is fairly warm before noon, the snow melts and water trickles down the valleys. Sometimes it hails ».

The temperature was recorded indoors on 15th June at Beit Moftah, at 9 p.m., and on the 16th June on the summit of Djabal Al-Nabi Shu'eib, at 9-10 a.m., and it was 14° and 16° C. respectively.

Cultivation is extensive in this region during the summer only, nothing shooting forth in the winter owing to the frost and frozen water. Agricultural rotation is dual, for example wheat, barley, lentils, broad beans, lucerne, mustard, etc. which are followed by maize. Moreover, at Qa' Sahman and its adjacent southern wadis grows the reputed Matari Coffee. The flora on mountains is represented by *Marrubium, Thymus, Malva, Ruta, Gladiolus*, etc.

On *22nd June*, Beit A'ala village (2160 m.), situated at the beginning of Arhab region, North of San'aa, was visited, and Al-Sheikh Saleh Hammoud Mahdi stated :

« Locust swarms usually invade this region every five years from the North. They remain on the spot for five years, laying eggs, hatching, feeding on all crops and grasses, moving mostly to the South or slightly eastward according to the direction of the wind, and finally disappear completely for another five years ».

This is undoubtedly a very interesting piece of information, though it is unique. As a matter of fact, I never heard anywhere in Yaman anything that corresponds to it, say an outbreak lasting five years and followed by five years of truce. In reality, the invasion from the North occurs every ten years, but the informer expressed in his own way, that is to say by counting the number of years only after the locust have totally disappeared. The informer was unfortunately unable to point out the date of the last invasion, but emphasized his previous declarations. He also added :

« We do not know of any means of control. The landlords pray God to remove the plague. The poor natives fill up with locusts as many sacks as they can, and lay in stock for the years when there are none. Both land-

lords and natives eat locust, but the poors make it their main food. This is done everywhere in Yaman ».

It may be said that swarms reaching from the North proceed either from Wadi Al-Kharid, or from the farthest region, as Nadjran. No migration comes to Beit A'ala from any other direction, and this may be due to the topography of the region.

Beit A'ala is a good agricultural district, in which cereals, lucerne, vegetables, fruits, *Tamarix* and other trees are grown.

On *23rd June*, at Wadi Shira' (1980 m.) near Homâd village, several hundreds of individuals of the solitary phase of *Schistocerca gregaria* Forsk. were found hopping here and there. However, no egg-masses could be detected.

Al-Sayed Mohsen Mohsen, governor of the Arhab region, gave the following information :

« The locust season comes between May and August. In the early summer, swarms come almost always from the North, migrate mostly to the South or West, and occasionally to the East. In the late summer, swarms also come from East or South, and migrate towards the North or West. No migration was ever recorded coming from the West. Egg-laying occurs in the region, hoppers hatch, feed and migrate when they are adults, with the exception of a few individuals which stay on the spot. Other swarms arrive after two years and join the old remnants. Briefly, locusts are always present here. I noticed that the most harmful swarms are the thick ones occurring every seven years and coming from the North, probably from Nadjran or elsewhere ».

The above information may be considered as follows :

The early summer invasions (May and June) originate from Al-Djauf, or northerly further from Nadjran. Invasions occurring in the late summer (July and August) proceed from Beihan southwards, and from the mouth of Wadi Al-Kharid eastwards. Locusts never clear off from this area, and the great number of solitary individuals which are found on it, represent the remnants of previous swarms. Therefore, a locust observation and bioclimatic study in such a standing infested region may be of some importance. The fact that invasions occur every two years from the South or East is explained by the possible occurrence of some other outbreaks or breeding places at Beihan to the South, Nadjran invasions on Al-Djauf to the North-East, and mouth of Wadi Al-Kharid to the East. As for the lack of migrations from the West, it may be due to the high altitude of the plateau westward the area in question ; thus the swarms are led to follow a pass further North than the approximate latitude of Shira'. Then the relief of Wadi Al-Kharid causes the apparent northerly direction towards Wadi

Shira'. The record of a great invasion occurring every seven years from the North confirms the information received at Al-Turbah, and later on at Ain Al-Kharid, Al-Hayfah, Al-Djauf, and San'aa. Migrations to the South are obviously towards Beihan.

Wadi Shira' is situated at the foot of Djabal Al-Haleel, in the North-East plateau of Yaman. A great part of its bed, which is sandy and alluvial. is prepared for the cultivation of cereals after rainfall ; and *Acacia*, *Tamarix*, *Calotropis* and quitch grass also grow here and there. Its water runs in Wadi Al-Kharid from South-East to North-West. On the whole, through its agricultural and climatic conditions, Wadi Shira' is certainly an ideal place for outbreaks of locusts.

Several oter wadis are met with before reaching Wadi Shira', the more important of which are Wadi Doghaish and Wadi Saminah. They run from West to East, their water run into Wadi Al-Kharid, and are of about the same nature in soil and flora as that met with in Wadi Shira'.

On *25th June*, at Ain Al-Kharid (1920 m.), the following information was given by Al-Shẹ́ikh Mohamed Abd El-Wahhab Senan :

« It is rare to see the district free from locust. Invasions occur after early rain in summer (May and June). Swarms come every two or three years, always from the North, migrate to the South or occasionally to the East. Eggs are laid and hatch, hoppers feed, and when full grown migrate to the neighbouring wadis that join Wadi Al-Kharid. The great invasion always takes place every seven years. It occurs during summer (June and July). The swarms come probably from Nadjd, like black clouds, and so thick that they prevent sun-rays from reaching the earth. Their direction is partly southerly and partly westwardly ».

It may be explained that migrations to the East reach the mouth of Wadi Al-Kharid, those to the South are towards Beihan and the southern corner of the peninsula, and those to the West towards the western side of the plateau and the Tihamah. Owing to the fact that the invasion of Wadi Al-Kharid is continued from the North, and apart from the seven years northern swarms, there should be a breeding area at Al-Djauf or further northerly at Nadjran or even farther still at Wadi Dawasir.

In Wadi Al-Kharid, near the mouth of Wadi Shira' is situated Ain Al-Kharid, a source of warm water (35.5° C.) running the whole year round and in which some *Bufo* and many *Barbus* live. This water reaches the edge of Al-Rob' Al-Khali through the great length of Wadi Al-Kharid. At the Ain, Wadi Al-Kharid is about 40 metres wide, and its steep vulcanic sides reach some 90 metres in height. Again, at the same point, the soil is less sandy than alluvial, muddy on the whole, and with scattered boulders. The inhabitants state that further along the Wadi, the soil is of

entirely different nature, and under good cultivation. A walk of about five kilometers in the Wadi showed that its flora is represented only by thicket of *Typha*.

On *27th June*, at Al-Hayfah (2400 m.), I met Al-Sayed Ahmed Ibn Mohamed Abdallah Al-Kabsi, superintendent of Arhab region. He said :

« Periodical locust migrations are recorded every seven years. They occur in summer (June and July), coming from Nadjd, and migrate towards San'aa and to the South of it. There are also lesser swarms coming at unfixed times. They proceed from the Tihamah and are directed towards the East, or from Nadjran and towards the South. Both of them usually occur at the beginning of the summer (May and June), and the swarms land on the area around Al-Ershan village, eastward of Al-Hayfah, where grow cereals, vegetables, fruits, etc. Other swarms come about the middle of the autumn (September). These proceed from the East and are directed towards the Tihamah. On the whole, no egg-laying occurs in the region ».

In its main lines, this information agrees with the writer's point of view. However, it remains to explain why this region is invaded by swarms proceeding from the East and directed towards the Tihamah, when such swarms were not recorded at Wadi Shira'. Is it due to altitude and relief ?

On *30th June*, at Na'it village (2900 m.), Al-Sheikh Mohamed Ghalib made the following statement :

« Locusts do not land at Na'it. At the beginning of the summer (May and June), swarms are seen passing northwards of the village from West to East proceeding to Wadi Al-Kharid, and vice-versa in the autumn (August and September). No other directions were ever noticed ».

The fact that the northern swarms do not land at Na'it may be explained by the position of the site which is more or less West to the longitude of the northern migration to the South. Low temperature as well as climatic conditions may also be a factor preventing the attraction and landing of swarms in this spot.

Na'it is a cold and arid region, and subject to excessive rainfall and hail. Its soil is more or less flat and of a loess-like nature. Many depressions are filled by rain water, and form small ponds inhabited by mosquitoes. Malaria is probably the cause of the fewness of the inhabitants in this village.

On *13th July*, at Amran (2280 m.), Al-Sayed Mohamed Al-Sayyafi, superintendent of the locality, gave the following information :

« Locust migrations occur every three years during the summer, proceeding from the western Tihamah and directed towards the East. Swarms return in autumn to where they come from. No swarms were ever noticed coming from North or South ».

Here again, the absence of swarms coming either from North or South may be explained by the fact that the direction of both migrations occur at a further easterly longitude than Amran, as was the case in Na'it.

This mountainous region is under wealthy cultivation. Qa' Al-Boan (2560 m.) is situated close to the western side of Amran, and is also rich in cultivation.

On *14th July*, at Kuhlan (2430 m.), Al-Sayed Husein Dahhan Saqr, superintendent of the district, made the following statement :

« Locusts come in great swarms from the western Tihamah, every three or four years ; usually the invasion takes place after the first summer rainfall (May). Locusts settle for a few days, feed, and migrate towards the East. Egg-laying does not occur. The most recent invasion took place in 1934, and was preceded by two others which occurred in 1930 and 1931 as far as I recollect. Other swarms, less numerous in individuals, arrive after the second summer rainfall (Autumn-September). Invasions from the North-West occur at the same time as those from the Tihamah. No swarms come from the South ».

It is again worth noting that at Kuhlan there are no swarms coming from the North and the South, as was the case in Na'it and Amran.

The western or Tihami swarms proceed to the East in Wadi Al-Kharid where, in my opinion, eggs are laid. It is also believed that the adults which result, return to Kuhlan in the autumn of the same year on their way to the Tihamah westwards. The North-West migrations may represent swarms that came from the West to Wadi Murr and incorrectly reported as from the North-West. As a matter of fact, the relief and direction of the Wadi Murr branches North-West of Kuhlan lead to the assumption that the migration takes its origin from the North-West. The excess of rainfall in July, hail, cold and sudden usual drop of temperature, are undoubtedly the main reasons preventing egg-laying on the Kuhlan plateau.

The agricultural production in Kuhlan is the most extensive I noticed in the Yaman. Crops and plants are generally rich in darker chlorophyl, vigorous, and denser than anywhere. East of Kuhlan is situated the great depression of Al-Ashmoor (Qa' Al-Ashmoor), at 2780 and 2820 metres in altitude at its lowest and highest levels respectively. Agricultural rotation in the Kuhlan and Qa' Al-Ashmoor areas is always for winter crops, which such as broad beans, lentils, wheat and barley, and which are grown again after harvesting, three or four times yearly, providing there is the necessary amount and continuation of rainfall. Maize and other summer crops were not noticed growing beyond 2200 metres of altitude.

On *17th July*, at Wadi Sharis (1080 m.), where opposite to Wadi Al-

Khattafah, Al-Sheikh Saleh Al-Dthamari, superintendent of Sharis region, gave the following information :

« The greater locust invasions come from the Tihamah during the summer (May to July), every three or four years. If dust storms occur, locusts clear off and move eastward, even on the same day of their arrival, or one or two days afterwards. When climatic conditions are favourable, egg-laying occurs in the Wadi Sharis, hoppers hatch and feed on crops and all plants. Small swarms occur in the summer, arriving from the East and North. Larger swarms usually come in autumn from the East, feed for several days and move towards the Tihamah without laying eggs. Wadi Sharis is never invaded from the South ».

From the above information, it appears again that no migrations reach Wadi Sharis from the South, and this corresponds to what was observed at Na'it, Amran and Kuhlan. Swarms coming from the North may originate from the western Tihamah ; these, when arriving on the northern extension of Wadi Murr, are incorrectly believed at Wadi Sharis as originating from the North. Two migrations occur from the East, during the summer and the autumn respectively. The autumn migration is obviously a true one The summer one represents only swarms that left Wadi Sharis on account of local atmospheric disturbances, and which took rest somewhere eastwardly until more favourable conditions, and then returned to where they came from.

A few couples of the solitary phase of *Schistocerca gregaria* Forsk. were found in Wadi Sharis.

Wadi Sharis is situated between the interior plateau of Yaman and the western Tihamah. It is a large wadi, about a hundred metres in width. Its bed is full of boulders, and a few wild plants grow on its banks. Occasionally, strong dust storms are blown by the western winds from the Tihamah with the result of reducing the visibility. Rain is frequent and hail may fall. On 19th July, rain and hail dropped on the wadi and the Kuhlan ridge, between 2.10 and 3.50 p.m. There fell about 40 mm. of water, which ran in the wadi like that of a very strong stream.

On *23rd July*, at Hadjah (1740 m.), Al-Sheikh Eissa Ibn Mohamed Ageel stated as follows :

« Migrations come almost always from the western Tihamah, every three or four years, during the summer. Some swarms also come from the North during the summer, together with those arriving from the Tihamah. In autumn, a few other swarms cross from the East on their way to the West (Tihamah). No swarms come from the South ».

Here, we notice again that no migrations come from the South. It may also be understood that the northern swarms come in fact from Wadi Sharis

or further North from Wadi Murr's upper branches, originating from the western Tihamah, thus not truly from the North

Hadjah may be considered as possessing one of the best moderate temperature found in the North-West of Yaman. Summer and winter crops are grown, mainly coffee, almonds, walnuts, and olives. *Tamarix* also present.

On *24th July*, again at Hadjah, was met with Al-Qadi Mohamed Ibn Ahmed El-Ekam, a great personality and a chief (Sheikh) of the Zu-Husein Tribe of Al-Mashriq, from Al-Djauf. The following interesting information on locust movements at Al-Djauf (North-East Yaman) was given :

« The soil is more or less sandy at Al-Djauf. The rainfall is slight, but irrigation depends mostly on the water flowing from Wadi Al-Kharid. Common crops are whaet, barley, maize and sesame. Wild plants are scarce at the border of Al-Rob' Al-Khali (the desolate portion), so wild animals come and feed about the rim of the cultivated area. As for locusts, the greatest migrations usually come from Nadjd, about the middle of the summer, every seven years. Individuals are brownish-red in colour and are termed the « Nadjdi Locust ». They lay egg-masses, and hoppers hatch. These, together with their parents, feed on the crops, and finally move to the East, South and West. A huge amount settle in the region for about one and a half years, that is to say, up to the autumn of the next year. Then, migration starts to the West and South, and the region is free again, with the exception of a few yellowish individuals almost harmless to crops. Other swarms, quantitatively less numerous in individuals, may occur every two years, coming from the western plateau. They are of a reddish colour and slightly paler than those of the North previously mentioned, and termed « Tihami Locust », owing to the origin where they come from. This « Tihami » invasion occurs about the beginning of the summer, and do not settle long, only for about one month. If migration starts early after the arrival of the swarms, its direction tends to the North or to the further East. In case the migration is delayed, then swarms proceed towards the South. The « Tihami Locust » lay egg-masses in the country, and feed. It is of a great nuisance though it does not settle for more or less longer than a month ».

In its main lines, the above information agrees with the present writer's comprehension of the matter, and may be completed by the following comment :

The occurrence every seven years of a northern invasion, corresponds with the data already stated in other regions of Yaman, such as Al-Turbah, Wadi Shira', Wadi Al-Kharid, Al-Hayfah, and San'aa. Migration of both « Nadjdi » and « Tihami » locusts towards the East, may proceed either

to a further locality somewhere at the mouth of Wadi Al-Kharid and the border of Al-Rob' Al-Khali, or again to a farthest area in the East (may be South-East) at Wadi Hadhramaut. The summer and autumn migrations towards the South, are undoubtedly directed to the Beihan area and the farthest southern corner of the peninsula. The summer swarms after reaching Beihan, in my opinion, may continue their migration, while the autumn ones settle there to pass the winter. The « Tihami » locust which is occasionally directed early in summer towards the North, may be considered as affecting the Nadjran plateau. The different directions (North, East, South and West) of the migrations are undoubtedly due to a sudden change of climatic factors (wind, rain, humidity, rise or fall of temperature, dust storms, standard pressure, etc.) in the North-East part of the Yaman plateau, and which may have a considerable effect on certain areas in the vicinity of the plateau, like that of Al-Djauf for example, though this locality is more or less of a desert type. It is rather difficult to explain why the « Nadjdi » locust usually settles for more than a year at Al-Djauf, while the « Tihami » one stays but only a month. If the former really originates from Nadjd, then it has in my opinion to cover a very long distance over the entirely arid and hot region of Al-Rob' Al-Khali before reaching Al-Djauf where it arrives completely exhausted; thus, physiological conditions may be a possible explanation.

The informer was unable to give the data of the last and previous invasions which occur every seven years from Nadjd. As for the « Tihami » locust, he stated that it took place in 1935.

As regards the « Tihami » locust invasions on Al-Djauf every two years, the present writer believes that there should be an area of such regular outbreaks, somewhere in the western Tihamah between Wadi Murr in Yaman and Wadi Djizan, as well as somewhere in the Assir Tihamah northwardly in Sa'oudi Arabia.

On *1st August*, at San'aa (2240 m.), the Capital of Yaman, the Members of the Expedition had the honour to meet His Majesty Al-Emam, King of Yaman, to express to His Majesty, in full loyality, their deep gratitude and sincere thanks for the warm hospitality and facilities they received everywhere in Yaman, and to beg permission to leave His Majesty's wonderful country. H.H. Prince Abdallah, H.H. Prince Husein, Al-Qadi Abdallah Al-Emari President of Minister's Council, Al-Qadi Mohamed Bey Ragheb Minister of Foreign Affairs, Al-Qadi Al-Motahhar Secretary to His Majesty, Al-Sharif Abdallah Al-Dhemni Commander in Chief of the Army, Al-Sayed Husein Ibn Aly Abd El-Qader Governor of San'aa, Al-Qadi Husein Mazhar Member of His Majesty's Council, were also present at the time of this Royal Audience, during which a talk on the results of the Expedition's

investigations was given. Then, this most honourable assembly unanimously agreed with the following information given by Al-Qadi Husein Mazhar :

« For a long time, I noticed that locust invasions on Yaman always originate from Iraq, every seven years, mostly during June and July, and then the swarms migrate towards the South. The locusts reach Yaman exactly 15 days after the newspapers of Iraq recording the invasion in that country reach San'aa. As the mail takes about a fortnight from Iraq to San'aa, the swarms are here 30 days after their outbreak in Iraq. The last invasion occurred in 1930, and therefore is expected again in 1937. The western swarms certainly come from Africa across the Red Sea, the eastern and southern ones may be remnants of the northern and western swarms that return again to suitable headquarters. On the whole, the most harmful migration on Yaman is the northern one that comes from Iraq ».

This most interesting and correct information definitely concludes that the northern invasion on Yaman originates from Iraq, and the flight distance between the two countries is covered in thirty days. This induces the writer to the conclusion that during that time, the swarms rest in Nadjd, Wadi Dawasir, then Nadjran, and finally reach the Yaman plateau.

San'aa is situated on a more or less level earth, the nature of the soil is partly alluvial and partly loess-like, and is backed in the South-East by a high vulcanic mountain, namely Djabal Nugum. San'aa comprises large number of orchards, especially at Al-Rodhah to the North, where grapes, peaches, apricots, apples, pomegranates, figs, prickly figs, almonds, walnuts and olives are grown ; besides, many kinds of vegetables are also cultivated as well as cereals.

II. RECORDS FROM HADHRAMAUT

On *31st August*, at Makalla (11 m., Arab Sea shore), Hadj Abdallah Philby (alias Mr. H. St. J. B. Philby) was met after his journey by car from Hidjaz to Hadhramaut. He had not seen a single locust on his way, on the border of Al-Rob' Al-Khali between Nadjran and Shabwah. However, he thinks that locusts lay eggs and breed in the Tihamatain (the two Tihamah).

On *12th September*, at Tareem (700 m.), Al-Sayed Omar Ibn Sheikh Al-Kaf expressed himself as follows :

« In 1930, six years ago, cloud-like locust swarms came from the West, about the end of summer (2) or the beginning of autumn. Individuals were reddish in colour, egg-masses were laid, hoppers hatched and were seen

(2) Seasons in Hadhramaut run as follows: Spring = January-March; Summer = April-June; Autumn = July-September; and Winter = October-December.

feeding on every plant, even on leaf-stalks of date trees. They settled for two years, moving up and down in Wadi Hadhramaut, and finally left toward the East and have not returned up to the present. Before this invasion, occasionally some swarms were noticed coming from the East, usually about the end of the spring. These do not land in the Wadi (valley), but continue their flight westwardly ».

The above inormation seems correct. However, in the present author's opinion, the eastern invasion may come from Oman and Al-Mahrah Country, originating from Persia, or again it may come from Nadjd as will be noticed later on when referring to Qabr Al-Nabi Hud.

On *20th September*, at Wadi Al-Khoon (590 m.), which is situated about twenty six kilometers East of Tareem on the way to Qabr Hud, only five individuals of the solitary phase of *Schistocerca gregaria* Forsk. were seen and collected in three hours during which time other insects as well were collected. This shows the scarcity of the Desert Locust in this place, and possibly these locusts may represent the remnants of a few individuals blown by the wind from the East from Qabr Hud (where several scores of the solitary phase of *Schistocerca gregaria* Forsk. were met), or again are individuals remaining from the previous year's invasion which proceeded from the West to Qabr Hud. Wadi Al-Khoon's bed is loamy, and the subterranean water of Wadi Hadhramaut superficially flows in Al-Khoon region. The flora consists of *Acacia*, Arak (*Salvadora persica* Garcin.),*Tamarix*, and *Zygophyllum*.

On *22nd September*, at Qabr Al-Nabi Hud (490 m.), an old man narrated the following :

« Locusts invade this region of Wadi Hadhramaut every second year. Swarms come from Nadjd (in the North), almost always in winter (October-December), and migrate to Olwah (the West). No northern invasions occurred in the winter of 1935. Other swarms come from Olwah, always in summer and autumn, and migrate to Hadhrah (the slope of Wadi Hadhramaut to the East), or again, occasionally, to Bahr (the sea, in the South). Both invasions lay egg-masses in the region after rainfall, thus in a soil damp enough. Al-Diba (the hoppers), which are brownish in colour, feed and breed. Adults that assume the red tinge of their parents, rise high in the sky in compact cloud-like masses, and take their migration direction. Swarms in little groups came here last year (1935) from the West at the end of the summer. Egg-masses were laid, hoppers hatched, and adults migrated at the end of the winter to the South-East (thus flying along the Wadi of Hadhramaut), and to the South (towards the Arab Sea). The most recent great invasion occurred six years ago (1930). Swarms came in autumn, from

the West, settled for two years in the country, bred, migrated up and down the valley of Hadhramaut, or farther East, and finally died suddenly in great numbers. Four years previous to this great invasion (in 1926), an invasion occurred from the West during the summer ; egg-masses were laid, Al-Diba hatched, and the adults migrated eastwardly by the end of the autumn ».

The information relating to the sudden death of huge numbers of the locusts of the 1930 great invasion, two years after they settled in the region, induced the present author to ask the informer if by chance he ever noticed at that time any particular thing inside the body of the locust when opening the insect before eating it (we know that locusts constitute the main meal of most of the inhabitants in Hadhramaut). He replied :

« We found Al-Howat (plural of Hoot, which means whale) in its chest behind the head ».

According to the detailed description given by the informer of Al-Howat, it corresponds to parasitic larvae of Diptera, mainly of *Sarcophagidae*.

This information which contains many sound points on the movements of the Desert Locust at Qabr Hud, may be completed by the author as follows :

The winter invasion of the region is mostly explained by the northern and north-easterly winds prevailing in that season, and to favourable hygrometrical conditions on account of rainfall which occurs once or twice after such winds. Regarding the invasion originating from Nadjd, its starting point may be found at the northern boundaries of Oman and Al-Hassa, or even from further localities in Iraq and Persia. The late summer and early autumn western invasions may be affected by rain and wind. As a matter of fact, rain may fall during the summer after South-East winds, and again wind may blow from the West. In autumn, rainfall is more frequent than in other seasons, and the wind is mostly southerly. The South-West winds which occasionally blow in that same season are affected by the relief and the direction of Wadi Hadhramaut, and possibly blow locusts from the West to the East. The sandy but with the more or less alluvium soil of Qabr Hud contains lime-stone dust washed from the wall hills of Wadi Hadhramaut, and much froth. It produces little wheat, barley and maize. Wild plants or trees are represented by *Zygophyllum*, *Zilla*, *Retama*, *Salvadora*, *Tamarix*, *Acacia*, and *Alhagi*.

On *29th September*, at Sayoun (715 m.), Al-Sayed Abu Bakr Al-Kaf and H. H. Sultan Dja'far Ibn Mansour Ibn Ghalib Al-Kathiri made a statement which corresponds almost exactly to the information previously recorded at Tareem, but with the addition of the following :

« We have never seen locust invasions coming to Sayoun from the East.

Some swarms of the usual and common western invasion deviate southerly ».

In the present writer's opinion, the Sayoun invasion did not come from the East, as the swarms which proceeded from Qabr Hud that were declared to be directed westwardly, may have taken a more northern or southern direction after their start from Qabr Hud than that of Wadi Hadhramaut at Sayoun. The southerly direction of locust swarms at Sayoun is due to favourable conditions found in some southern tributaries of Wadi Hadhramaut in this region, namely Wadi Githmah and Wadi Shuhooh.

On *30 September*, at Shibam (725 m.), H.H. Sultan Aly Ibn Al-Ga'eety made the following statement :

« A locust invasion usually occurs every seven years, and the locusts stay in the country for about two years. Swarms migrate mostly to the East and occasionally to the South. During the seven years before 1930, locusts were always present. The 1930 invasion occurred in July and came from the West from Al-Qatn (740 metres altitude, and about 40 kilometers South-West of Shibam). I strongly believe it originated from the Tihamah of Yaman and from Beihan, because I frequently noticed that the swarms reached the Qatn-Shibam area twenty days after their departure is reported from Beihan by nomad arab tribes. No invasion of the country has occurred since 1930 ».

Undoubtedly, the above information is most interesting. However, the declaration that no swarms have come since 1930 disagrees with what was heard at Qabr Hud (and confirmed further at Hureidhah). Therefore, if both statements are to be considered correct, the 1935 invasion of Qabr Hud can be explained by saying that the swarms have passed over the Hadhramaut plateau (for example south-westward the great Wadi of Hadhramaut) and hence could not be seen at Shibam, or even at Sayoun and Tareem. Another striking feature of the information is the permanence of locusts during the seven years before 1930. As a matter of fact, no confirmation of such was ever met with in the whole Hadhramaut, except a record of swarms in 1927 at Al-Hureidhah, and in 1928, only sparse swarms occurred. Southerly migrations at Shibam are due to favourable conditions in Wadi Ibn Aly such as relief and vegetation.

The ground between Shibam and Al-Qatn, south-westwardly, is almost alluvial, more or less flat, and extensively wide owing to the conjunction of Wadi Hadhramaut proper with Wadi Serr. It constitutes the widest area in the Wadi Hadhramaut, under wheat and barley cultivation after rainfall. Two kinds of wheat are grown once in the year, during the winter, one is harvested after two and a half months, and the other after 4-5 months.

On *1st October*, at Gougah (730 m.), seven kilometers West of Shibam, Sheikh Abdallah Ibn Salmein made the following statement :

« The last locust invasion of Hadhramaut occurred six years ago (1930) at the end of the summer (June). The swarms settled for two years, laid egg-masses from which hatched black and yellowish-black hoppers which became reddish fliers. Date trees and summer crops were devastated and wheat and barley were entirely eaten during the winter. The same damage occurred in 1931. Famine prevailed during these two years in the whole country ; the price of rice rose from 10 to 40 Theresa dollars (for example 20 to 80 shillings) per sack of 80 kilos. Migrations were mostly eastward and partly southwards. Before this great invasion, locusts usually invaded the country every second year at the end of the summer (if Tihami locust) or the beginning of autumn (if Nadjdi locust), usually originating from the West and North-West respectively. Most of the black hoppers and particularly those which arise from the latter invasion (Nadjdi), perish under a heavy shower of rain. Adults, after laying eggs, occasionally return to the West or to the South by the end of the winter ».

The above information shows that migration towards the South is usually towards Wadi Ibn Aly in the Hadhramaut plateau. Here again, it may be noticed that before the 1930 invasion, locusts predominated every second year as already recorded at Shibam. The North-West invasion, or the Nadjdi, most probably takes its origin in Nadjran, and usually migrates to the South-West, South, or even to the West, in relation to the wind system which mostly blows northerly and sometimes easterly during the winter. Swarms that migrate westwardly in winter may settle at Beihan, and those migrating southwardly may land on the other southern side of the Hadhramaut plateau, the coastal plain, or again either cross the Arab Sea or perish in it.

On *2nd October*, at Diar Al-Boqri (725 m.), information on locust movements did not vary much from statements obtained at Shibam and Al-Qatn. Diar Al-Boqri is situated some 70 kilometers South-West of Al-Qatn. The road leading to this village is covered, here and there, by a layer of fine sand, probably brought by western sand storms. On its alluvial soil grows almost the same crops as are found in the Wadi Hadhramaut, and « Arak trees » are numerous.

On *3rd October*, at Hureidhah (740 m.), much interesting information was obtained from the diaries of well educated persons.

In Al-Sayed Aly Ibn Hasan Al-Attas diary, the following record was found :

« Locust came from the West, like clouds, reddish in colour, Tihami type, on Wednesday Zul-Heggah 15th, 1345 (or June 15th, 1927). My mule trampled on thick layers of locusts ».

This record was verbally completed as follows :

« Egg-masses were laid and hatched. Hoppers and adults ate all vegetation, even the leaf stalks of date trees. The invasion was followed by smaller swarms which came from time to time. This situation lasted two months after which the locust migrated eastwardly ».

The following records are abstracted from Al-Sayed Hamed Abu Bakr Al-Attas diary :

A. — « On Wednesday Ragab 14th, 1347 (or December 26th, 1928), while on my way back from Makalla to Hureidhah, the weather was exceedingly cold and windy. At noon, from a distance of about 20 kilometers, I saw a locust swarm, flying low over the plateau from the North-West towards the South-East. I watched it carefully with my field-glasses, thinking it might land on cultivated land. Soon afterwards, the swarm dipped into the sea and entirely perished ».

This information was completed verbally as follows :

« Arab travellers following my journey confirmed my observations on every point. The locust was reddish in colour. Again, on my arrival at Hureidhah, similar information on the direction was confirmed by the inhabitants ».

B. — « On Sunday Moharram 25th, 1349 (or June 22nd, 1930), locusts came from the West, in a very compact cloud-like mass which darkened the sky. The swarm measures about one kilometer in width and several kilometers in length. Its front part continued its way to the East along Wadi Hadhramaut, while the other part landed here ».

And further on in the diary :

« The region is freed from locusts on Tuesday Rabee Al-Awal 8th, 1351 (or July 12th, 1932) ».

This record was completed by the following verbal statement :

« Locust settled for about two years, laid eggs, hoppers bred and fed on every crop or wild plant. Adults nearly always migrated eastwardly but occasionally southwardly. I cannot recollect the wind direction at the time of the invasion, but it rained heavily about one week before, and a wave of hot weather followed ».

C. — « On Friday Ragab 7th, 1349 (or November 28th, 1930), the weather was very cold. Locust came from the West, like clouds, reddish in colour, and joined the offspring of the summer invasion of the same year ».

The informer completed verbally what follows :

« The swarm settled for eight days, laid eggs, split into smaller groups though of a large number of individuals which migrated in every direction in the neighbouring wadis to a distance of about four miles ».

D. — « Locusts came on Sunday Gamad Al-Awal 5th, 1354 (or August 4th, 1935). The swarm is of moderate importance. Individuals are reddish in colour. Three quarters of the invadors fed very little during their short stay of about half an hour, and migrated eastwardly without having laid egg-masses. The remaining quarter settled for the night and migrated in the following fore-noon, partly southwardly but mostly towards the East ».

A comment given here by the present writer on the above information may be useful.

From Al-Sayed Aly Ibn Hasan Al-Attas' record, it is seen that the locust migration continued towards the East. Possibly, the swarms may have reached Oman in August or September, then migrated north-westwardly to Al-Hassa, Koweit, and Iraq in December. In March 1928, under the influence of south-eastren monsoons, the migration extended to Palestine and Transjordania from where, in April 1928, the swarms finally invaded the Sinai peninsula and Lower Egypt. It is almost certain that the 1928 great locust invasion on Sinai and Lower Egypt originated from the above mentioned circle. However, it worth mentioning here, that during an Entomological expedition performed from February to May 1928, from Kom-Ombo to Port Sudan, the present writer gave the first record on the occurrence of the Desert Locust in Wadi Garrariat (south-eastern Egyptian Desert), and discovered a very suitable area for locust outbreaks at Djabal Elba (extreme south-eastern boundary of Egypt). These facts were reported to the Egyptian authorities at the time of the locust invasion on Upper Egypt by swarms which came from Djabal Elba, or by swarms that originated in the Sawakin region and which came along the Red Sea Desert. The Sawakin outbreak was reported as being from a more southerly origin, possibly from Eritrea. The swarms which came from Djabal Elba crossed the Red Sea during the summer of 1927, and reached Egypt through Arabia. The swarms originating from Eritrea migrated to Sawakin where they spent the autumn of 1927 before reaching Djabal Elba in the course of the winter 1927-1928, and from where they invaded Upper Egypt from January to May 1928.

Information « A » states that the locusts proceeded from the North-West. In the present writer's opinion, the migration started from Nadjran and was affected by strong northern winds which conveyed the swarms southwardly. It may also be possible that the primary origin of these swarms is to be found in Nadjd, in about June 1928.

Information « B » refers, in the present writer's opinion, to swarms which almost certainly originated in Eritrea, northern Abyssinia, or the Central Anglo-Egyptian Sudan as the Kordofan area for example. That swarms migrated southwardly before breaking off in June and the first half

of July 1932, explains their stay for one year more on the sea shore of Hadhramaut. The migration which occurred all over Hadhramaut in 1930 is of similar origin.

In information « C » it is seen that migration came from the West while the whole extent of Wadi Hadhramaut had already been invaded since June 1930. Thus, it is possible that a new outbreak occurred in the Beihan area, its swarms migrated and intermixed with the already settled ones, in such a way that it was rather difficult for the inhabitants of the localities East of Hureidhah to think of a new invasion. Again, the migration may have occurred from the western direction, otherwise, it should have been noticed from any locality along Wadi Hadhramaut. As to the statement that egg-laying took place, it is rather difficult to understand how the informer could judge if such egg-masses were laid by the newly arrived individuals or by the old ones settled since June 1930.

In information « D », no statement is given of any migration over Diar Al-Boqri, Gougah, Shibam, Sayoun and Tareem, which are situated eastward of Hureidhah. This may be explained by the fact that the swarms took their migration over the plateau in a southern direction to Wadi Hadhramaut, reached Qabr Hud, and then migrated farther eastwards to Oman. Swarms which migrated southward to Hureidhah will be dealt with when recording the information concerning Ghail Ba-Wazir.

On *6th October*, at Al-Mashhad (730 m.), the following information was obtained :

« Locusts usually come from the West, or again from the North, at about the end of the summer (June), or the beginning of the autumn (July-August). Swarms settle from 8-25 days, lay eggs, and then migrate towards the southern villages and farther to the sea where they dip and perish. Other migrations may occur eastwardly. The last invasion took place in 1930, when the swarms settled for about two years ».

The writer may explain that the western direction of the invasion is of normal occurrence. Swarms coming from the North originated frm Al-Qatn area, and generally from Wadi Hadhramaut, because Wadi Do'an, which is one of the great tributaries of Wadi Hedhramaut, runs from South to North. Therefore, the direction of locust swarms is affected in this area by the relief of Wadi Do'an which they appear to enter from the North. The direction of swarms towards the South is either in Wadi Do'an or Wadi Al-Ain.

Al-Mashhad is the driest area in Wadi Do'an, and hence of very poor agricultural production.

From *9th* to *13th October*, at Khureibah (the village 1000 m., and the

Wadi 900 m.), Bureirah (1500 m.), and Ankadoun (930 m.), the information collected are condensed as follows :

« Most of the locust invasions come from the West, about the end of the summer (June). Individuals are reddish in colour. Other lesser swarms of yellowish or reddish individuals usually arrive in large numbers from the North at the beginning of the autumn (July-August). Both migrations proceed either to the East or to the South. The last invasion occurred in 1933. Swarms came from the West at the beginning of the autumn, settled for nearly a month, laid eggs, and migrated towards the sea and the East. During the autumn of 1935, a small swarm came from the North, crossed the region in the morning and continued its way towards the sea. The greatest invasion occurred in 1930, when a cloud-like masses of reddish locusts came from the West, settled for three years, laid eggs, hoppers bred, and destroyed every crop and wild plant. During that same period, other swarms came from the North from time to time, and joined their congenerous ones. Locusts finally cleared out the region, and migrated to the East but mostly to the South ».

It should be said that the western migration is normal, whether it originated from Africa or from Beihan. The northern invasion which is affected by the relief of Wadi Do'an, came from Wadi Hadhramaut proper. Migrations towards the East are due to the fact that the region between Khureibah and Ankadoun more or less falls in the area of the Hadhramaut plateau, in other words, in an open area. It is worth noticing that the swarm which crossed the region during the autumn of 1935 corresponds to that recorded at Hureidhah on August 4th, 1935. The invasion recorded in 1935 was never noticed at Hureidhah, Al-Mashhad, or anywhere else. Thus, if this record is confirmed, the invasion may have arrived from the West and the swarm eastwardly on the plateau, avoiding Wadi Hadhramaut and then southwardly in the direction of the wadis falling to the sea. Or again, the swarm originated from remnants of the 1932 locusts (in fact 1930) which settled for two years everywhere in the northern Hadhramaut, and hibernated in Wadi Amd or farther West in Wadi Beihan. As for the great invasion of 1930, which is recorded as having lasted for three years, hence one year more than it settled in the northern Hadhramaut, this may be explained by the presence of many high trees on the plateau, especially the Nabk (*Zizyphus spina-christi* Willd.) ; again, the climatical conditions on the plateau are more favourable than that occurring in the lower parts of the Wadi, and the nature of the soil though rocky is suitable in certain places for egg-laying.

On *16th October*, at Ghail Ba-Wazir (80 m.), Al-Sayed Hamed Ibn Abu

Bakr Al-Mihdhar, Minister to H.H. Sultan Saleh Al-Ga'eety of Makalla, gave the following statement :

« Locust invasions come usually from the West or North-West, and the swarms migrate either to the East and the North-East, or to the South where they perish. The great invasion recorded in July 1930 came from the West, and settled here for about three years, during which other successive swarms joined the invadors from the North and the West. The region was then freed from locusts for two years. In August 1935, a small swarm crossed here and continued its way towards the East. The northern invasions are a lesser danger than the western ones ».

It should be pointed out here that the swarm which crossed in August 1935 confirms the statements previously given of migrations which occurred at Hureidhah on the 4th August 1935, as well as on Khureibah, Bureirah and Ankadoun during the autumn of 1935. The western invasion has a similar origin to all those occurring over Hadhramaut from the same direction. The swarms arriving from the North-West are supposed to come from Wadi Al-Ain and Wadi Do'an. Migrations towards the East reach Al-Mahrah region and Oman, and those towards the North-East are supposed to the wadis nearby. The northern invasion came almost certainly from Wadi Hadhramaut, but through Wadi Idim and probably also from Wadi Ibn Aly. It is almost probable that its swarms proceed southerly and perish in the sea, and this may explain why this invasion is less harmful. It is worth mentioning that the invasion recorded at Khureibah, Bureirah and Ankadoun in August 1933, may not have been noticed at Ghail Ba-Wazir because the previous great invasion of 1930 lasted in fact up to 1933. The fact that locusts stayed in this coastal region one year more than in Wadi Hadhramaut, can be explained by natural, climatical, agricultural, and other favourable factors which occur here.

SUMMARY

(Yaman)

On account of two great rainy seasons which occur in April and August, many regions East of the Yaman plateau, namely Al-Djauf, Wadi Al-Kharid, and Beihan, and other areas at the western foot of the plateau (the Tihamah), are under very extensive cultivation, and are therefore suitable lands for locust settlements. Hence, the country is subject to locust invasions from the North, North-East, and West. The northern swarms proceed from Nadjran (Saoudi Arabia) ; the north-eastern from Al-Djauf, Wadi Al-Khaid, and further from Nadjd and Iraq ; the eastern from Beihan or from Wadi Hadhramaut ; the western ones from Eritrea, northern Abyssinia, or Central Anglo-Egyptian Sudan.

The greater and most harmful invasions occur every seven years, and from Iraq. Western migrations are reported every three or four years. Both northern and western invasions occur on Beihan (South-West corner of Arabia, between Yaman and Hadhramaut), where also outbreaks take place to invade Yaman and Hadhramaut. Adult individuals of *Schistocerca gregaria* Forskal were met by the writer as follows : gregarious phase at Wadi Nakhla (near Heis), solitary phase at Wadi Shira' (North-East of San'aa), and solitary phase at Wadi Sharis (North-West of San'aa).

Locusts are eaten in Yaman by indigents, as well as by a certain number of well off people ; lots of sacks filled with locusts are stored, in preparation for famine years. The poor people welcome locust invasions, while the landlords and the Government have very different feelings. No scientific measures of control are taken.

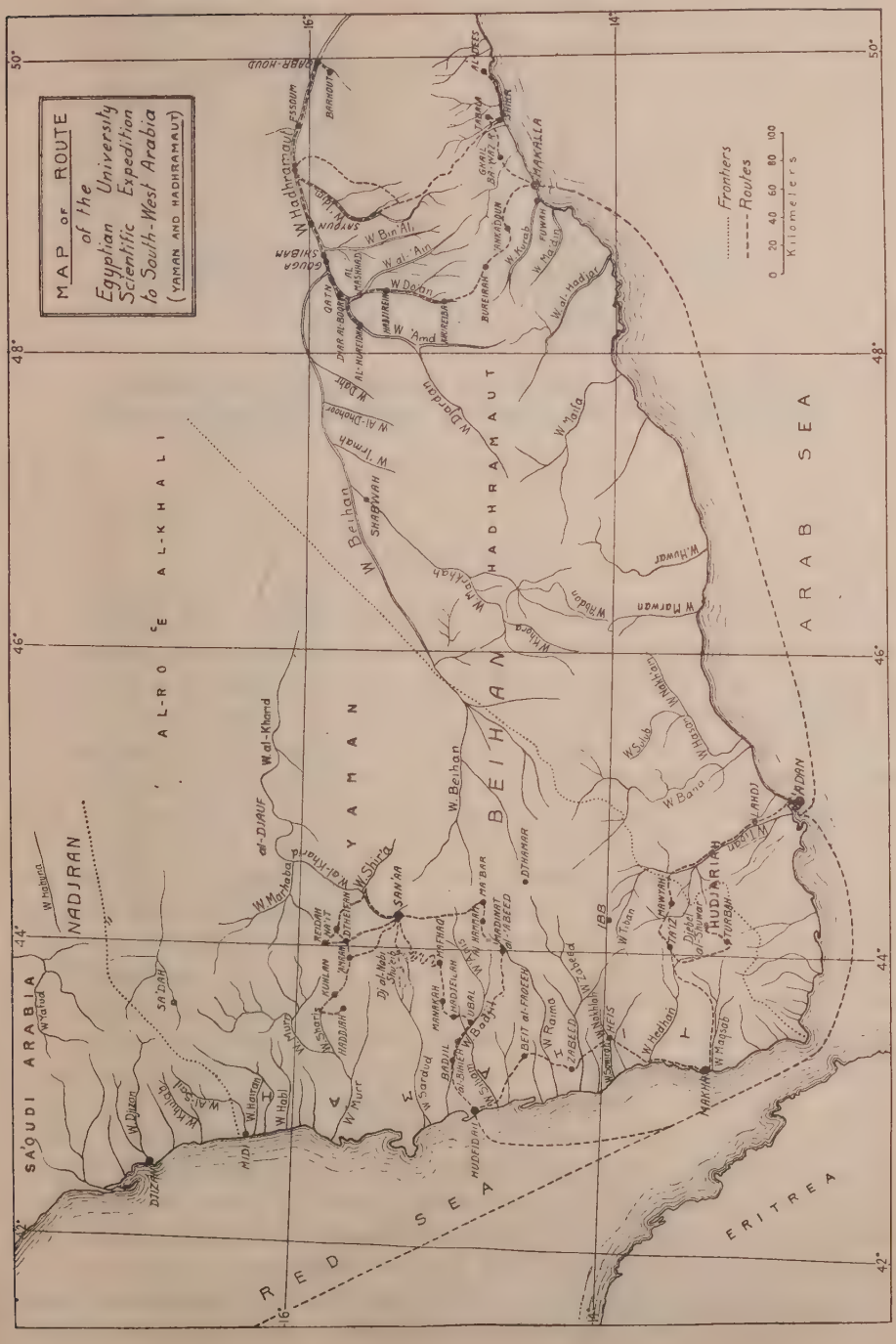
(Hadhramaut)

This country is subject to Desert Locust invasions coming from the North and West, usually during the winter and summer. The autumn invasions are in fact summer invasions which took a certain time to reach the concerned areas. The northern swarms on Qabr Hud (extreme East of Wadi Hadhramaut) are supposed to proceed from Nadjd ; the western ones originate either from Africa (Eritrea, Abyssinia, and Sudan), or from Beihan. An occasional swarm which came from the North-West, probably proceeded from Nadjran or Wadi Dawasir in Saoudi Arabia. Invasions on the extreme East of Hadhramaut (Qabr Hud) from Nadjd, occur every two years. Western invasions took place in 1927, 1930, and 1935. The 1930 invasion lasted two years in the northern part of Hadhramaut (Wadi Hadhramaut and its tributaries), while it lasted three years in the southern part of the palteau, as well as in the coastal region ; this is undoubtedly due to different climatical and other factors occurring in the concerned areas.

Adults of *Schistocerca gregaria* Forskal, solitary phase, were met by the writer at Wadi Al-Khoon (26 kilometers East of Tareem), and at Qabr Hud.

A natural enemy of the Desert Locust is recorded at Qabr Hud, namely the larva of a Sarcophagid fly.

Locusts are eaten in Hadhramaut as already recorded in Yaman. Control is unknown.



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APPENDIX

Notes on Climatic Conditions in South-West Arabia

(Based upon a Meteorological Record taken by the Egyptian University Scientific Expedition to Yaman and Hadhramaut, 1936)

by S. A. Huzayyin

INTRODUCTORY

In 1936, the Egyptian (now Fouad I) University of Cairo undertook an expedition to Yaman and Hadhramaut, consisting of three members and myself. It took place from April to October, thus during the rainy season in that part of Arabia. M. Tewfik was in charge of the Entomological investigations of the expedition, and he made a huge collection of insects from various parts of Yaman Plateau and Hadhramaut. He also took a special care to record various environmental conditions relating to these collections, for example relief, vegetation, etc. An interesting part of his work was devoted to locust migrations, and he was fortunate enough to establish good relations with the inhabitants of the regions we visited, and thus obtain valuable and particularly illuminating information relating to locust breeding, migrations, etc.

During the expedition, a meteorological record was taken by myself with the kind collaboration, on special occasions, of my colleagues N. Shukri and M. Tewfik. Owing to the obvious relation between vegetation and insect life, on the one hand, and climatic conditions, on the other, it was thought useful to add to Tewfik's publication on locust migrations a summary of the main results that may be deduced from the meteorological record. Of course it would not be practical to give here the full details and tables of the record taken — a publication which will have to await a later opportunity — but I shall state here the main results of these observations and field studies. Also a small selection of the obser vations recorded is given in tabular form at the end of this paper.

GENERAL REMARKS

The plateau of Yaman has been known to Classical writers as *Arabia Felix*. It derived this name from its relatively rich vegetation which distinguished it from other parts of Arabia. This richness in vegetation may be attributed to two main factors — namely its rich soil derived from vulcanic lavas and its semi-monsoonal climate characterised by summer rains. But the altitude of the plateau (compare various altitudes of Stations in Table I), has also contributed towards the increase in the amount of rainfall and its effectiveness owing to lower temperature. Taken in all, the climate of South-West Arabia is linked to that of the Abyssinian horn of Africa with some differences owing chiefly to the existence of the internal deserts of Arabia in the immediate neighbourhood of Yaman and Hadhramaut. Data relating to meteorological conditions in South-West Arabia, however, were very limited. It would be of course hazardous, or even misleading, to draw any definite or far reaching conclusions from a record like ours which is limited to one season and which has been taken at various places during our expedition. But the writer has tried to complement the record of observations with information collected from the inhabitants about wind, storms, seasons of rain, etc.; and the main results may be summarised as follows :

(1) *Ta'iz and neighbourhood* (April 20th-May 5th, 1936).

This represents the South-West corner of the Yaman plateau proper. The altitude of Ta'iz itself is 1300 metres , though it has in its neighbourhood much higher peaks which help to modify temperature and increase precipitation.

When we arrived there (April 20th) the rainy season had already started though it was not violent yet. Wind was usually calm in the morning and evening and breezy or relatively strong in the afternoon. Clouds accumulated in later afternoon, rain being showery and occurring specially about one hour before sunset. As time went on, rain became more and more frequent and violent with cloud covering continuing through night. Maximum rainfall for one day at Ta'iz being 31 mm. We were informed by the inhabitants that in early season rain was brought by southerly and South-West winds, but that later on (for example in Autumn) it was brought by south-easterly or even north-easterly winds. We may also note that the fall of rain during our stay was not necessarily accompanied by a drop in temperature (see Tables I and II).

(2) *Western Tihamah* [Red Sea Coastal Plain] (May 6th-15th, and August 11th-15th, 1936).

The coastal plain of Tihamah was traversed from Makha in the South to Hodeidah in the North. We visited it twice, for example in May and in

August. This is a low-lying coastal plain shut in between the Red Sea and the tilted edge of the plateau. It is a particularly hot, humid and unhealthy region. There was very little variation of temperature especially in early summer (see Table 1). The daily range of temperature was somewhat larger in August than in May. The air was also humid and the amount of humidity appeared to rise in the afternoon owing perhaps to increased evaporation. The sky was clear at night, but it is interesting that the temperature did not fall greatly or even abruptly at night as we have been expected in a desert-like sandy plain. We have also experienced dust-wind activity (*Ghoba*) and sand-storms especially in the afternoon. Sand dunes were chiefly directed by South-West winds of the summer. We were informed that the wind system was southerly (for example South-West) during the months of March-June, northerly in July-October, and variable during rest of the year. It is possible that the northerly winds of August may have been responsible for the slight increase in the daily range of temperature which we noted in that month. Finally we may note that the Tihamah is hardly affected by rain in the season of the monsoons. It only gets the torrents from the neighbouring highlands. We were informed that, apart from occasional drops, rain falls only once or twice per year.

The extreme rarity of rain in the Tihamah is also responsible for the fact that, unlike the case on the plateau, maximum temperature on the coastal plain is reached (at least during summer months) about 3 p.m. As we shall see later on, temperature on the plateau is affected by the atmospheric conditions leading occasionally to a drop in temperature in the early afternoon. Also the Tihamah is different from the plateau in the fact that there is more cloud covering in the morning than in the afternoon (when the sky usually clears up). It is possible to draw the conclusion that clouds start from the sea in the morning, are driven towards the plateau during the day, and are precipitated as rain on highlands in the afternoon and early evening. Whatever this may be, it is clear that as heat rises in Tihamah in the afternoon, the cloud covering is dissipated.

(3) *Western Side of Yaman Plateau* [Hodeidah-San'aa Route] (May 16th-17th, and August 4th-10th, 1936).

This is a complicated area. Its western edge represents the transition from the Tihamah to the highlands. The plateau rises in a series of a fault-steps towards the East. The high level of the plateau is something between 1500-2500 metres though it has some higher peaks.

Climate conditions, especially temperature, wind-direction and amount of rainfall, are very much affected by relief. Temperature actually depends very much on altitude. Not only in the western edge, but also within the plateau itself there exists a number of deep valleys where temperature is

naturally higher than on the toplands. It is interesting to note that on rainy days maximum temperature is usually reached about noon. In the afternoon, temperature falls steadily, and rain usually falls late in the afternoon or in the early evening. On the high toplands, rain is invariably accompanied by thunder and lightning and the fall of temperature may be so abrupt and conspicuous as to lead to hail. The direction from which the rain comes is not constant, and it is probable that this direction is very much affected by local relief. It is evident that the clouds must come from the West, but there is much deflection of winds (driving the clouds) by relief. It is also clear that a great deal of the rain is caused (or accompanied) by atmospheric disturbances especially over the higher parts of the plateau. We have also noted the existence over the valleys cutting the plateau of haze brought by dust-storms blowing in some cases originally from Tihamah. It is quite evident however, that even at the western edge of the plateau, conditions are far from being of true desert type. We have noted in particular that the temperature does not fall quickly during the night and that minimum temperature is not reached until one hour before sunrise.

(4) *The Interior Plateau* [San'aa and neighbourhood] (May 18th-June 22nd. July 3rd-11th, and July 28th-August 3rd, 1936).

This represents the interior of the Yaman plateau. Climatic conditions are here affected by altitude (San'aa 2240 metres) and also by relief. To the West and South-West, the plateau extends with its high toplands which force a great deal of the moisture brought originally by the South-West monsoons to precipitate before reaching San'aa area. Consequently, San'aa has a less rainfall than a place like Ta'iz which lies in the South-West corner of the plateau. The former be considered as lying, more or less, in the rain shadow area of the higher plateau to the West. The effect of altitude at San'aa is also clear in temperature; the mean maximum temperature in May and June being about 24-25° C. There is also a wide daily range of temperature reaching on one occasion as high as 17.1° C. (see Table I). We also noted that pressure decreases as a rule in the afternoon. As for the rainfall, we have been informed by inhabitants that there are two rainy seasons or rather one rainy season with two clear sub-maxima. The rain starts in the spring (March) and finishes in early autumn (August-September), reaching its first sub-maximum in April and its second in August. The interval between the two sub-maxima (May and June) is relatively warm and dry. Winter months are dry and cold. As far as our observations go, this information is largely correct. We have also been fortunate enough to find an almost complete record for the rainfall in the year 1935 at a Government Meteorological Station in San'aa. This station was first equipped by C. Rathjens a few years earlier, but we could

not find at it except the record for that year and the early part of 1936. We reproduce it in Table II by kind permission of the Yaman Government. From it we see that the total rainfall at San'aa for 1935 was about 40 centimetres. It is also clear that the rain in the second sub-maximum is more or less concentrated in one month (August), while the first sub-maximum extends over a longer period (middle March-end April). We also have reason to think that during the first sub-maximum south-westerly winds penetrate more widely into South-West Arabia and rainfall is dispersed over a wider area. During the second sub-maximum on the other hand, southerly winds are more restricted in their extent. It is also feasible to think that the rains of the second sub-maximum are more effective in their influence upon vegetation, as they are not followed by such a warm and relatively dry interval as that of May-July. Another point of difference between the rains of the two sub-maxima is that although rain in this area is usually accompanied by storms and lightning, we have been informed that during the first sub-maximum South winds are more remarkable while during the second one northerly winds « bring the rain ». Our own observations apply more particularly to the second sub-maximum, and we are able to state that although on certain rainy days of the second sub-maximum wind was southerly, rainfall was accompanied by storms and lightning. South winds are also more characteristic of dry days. It may be possible to draw that it is the meeting of northerly and southerly winds that fosters the formation of storms. The second sub-maximum is also characterised by the existence of mist and fog, especially in the valleys between the highlands. Also on rainy days maximum temperature is usually reached about noon, after which the temperature falls apparently as a result of northerly winds. It is this drop of temperature which promotes precipitation in the afternoon.

As for the relatively dry interval which separates the two sub-maxima, the climate is characterised by relative aridity and warmth (see Table I). Only little rain falls during this interval in spite of the existence of cloud covering in the afternoons. We may perhaps infer that the existence of a deep low pressure centre over Central Arabia during May and June draws humidity towards the interior of the peninsula, and that owing to the high temperature, part at least of that humidity is dissipated in the air. We have also noted in the San'aa region that the relatively dry interval separating the two sub-maxima of the rainy season is characterised by the existence of « *Dju'farah* » or dust-storms, occurring usually about noon or in the early afternoon. These storms occur also less violently during other months of the rainy season. They are due to local differential heating of the surface of the earth, and are an active agent in the transport of fine loess-like soil; and consequently they have their effect upon vegetation.

(5) *North-East Yaman* [Wadi Shira' and Na'it region] (June 24th-July 2nd, and July 13th-27th, 1936).

This region lies in North-East Yaman. Part of it (Shira', alt. 1980 metres) is lower than San'aa and the other (Na'it, alt. 2900 metres) is higher. Being nearer to the heart of Arabia we find more clearly the effect of continental (and even semi-desert) conditions — namely, wide range of temperature, dust-storms, etc. Indeed we find in this region the interaction of semi-monsoonal and semi-desert effects. The Na'it area is more characterised by the existence of haze and mist especially in the valleys. The high altitude of Na'it is also accompanied by particularly wide range of temperature reaching on July 19th 27.5° C. It may be interesting to note that on July 17th at Raidah (alt. 2420 metres near Na'it), the minimum temperature was 4.8° C. We have been also able to note that temperature in this part of the plateau is much affected by the direction of wind during our stay there. On one occasion (July 23rd), temperature was fell suddenly about noon and remained so until 1.30 p.m., when it rose to the maximum before falling again. This was accompanied by change of wind which transported heat. As for the relation of wind and precipitation, we have been able to infer that, as in the case of the San'aa region, the early summer rains are caused by southerly and westerly winds, while those of the late summer are largely accompanied by northerly, north-westerly, or even north-easterly winds. Often the northerly wind which promotes precipitation is temporary in occurance, for example it occurs for a short interval during the day at the time of the rain. It leads to a drop in temperature and is often accompanied on the high peaks by the fall of hail. At any rate, precipitation is usually violent and accompanied by a quick drop in temperature, indicating the arrival of a cold front. We may further infer that the meeting of warm and relatively cold fronts of wind does not only promote actual precipitation, but on certain occasions it also helps to raise relative humidity of the air. The same dust-storms which we noted at San'aa also occur in this region and continue during the late summer sub-maximum of rain.

(6) *North-West Yaman* [Wadi Sharis (alt. 1080 metres), and Hadjah (alt. 1740 metres)] (July 15th-25th, 1936).

This represent sthe North-West part of the Yaman plateau which falls gradually from the (Kuhlan) ridge towards the West, before reaching Tihamah plains. We may note here the marked difference in temperature between the toplands and the valleys. Also the wadis are usually covered with haze. It is said (by the inhabitants) that the dust and haze are brought by winds from Tihamah which may last for as much as a week at a time. These conditions, however, are accompanied by heavy rains and occasionally

also by atmospheric disturbances (thunder, lightning, etc.) in the afternoons. One afternoon at the Kuhlan ridge, there fell very heavy rain and hail (total precipitation estimated at 40 mm.) during one and half hours. Hail usually falls on toplands where it cools very quickly. We have also been informed by the inhabitants that rain is sometimes accompanied by westerly winds and sometimes by easterly winds. It appears, however, that the direction of wind is very much affected by local relief in this much dissected part of the plateau.

(7) *Hadhramaut Coast* [Makalla and Shihr] (September 3rd-8th, and October 15th-24th, 1936).

The South coast of Hadhramaut represents another hot coastal region though it differs in some respects from Yaman Tihamah. As we mentioned before, this latter is a low-lying coast shut in between the edge of the high plateau and the sea. In other words, it forms part of the bottom of a rift which runs from South-South-East to North-North-West. The closed condition of the Red Sea promotes high temperature and extremely unhealthy conditions. The coast of Hadhramaut, on the other hand, runs in an easterly or east-north-easterly direction, is not shut at the back by a high plateau (as the land rises more gradually in its hinterland) and it has a more open sea in front of it. Nevertheless, it resembles Tihamah in its high temperature and high relative humidity (see Table I). At Shihr, the range of temperature was not large (about 4 or 5° C.). This is largely due to the effect of the sea which does not allow the drop of minimum temperature. Also most of clouds in the coastal region appear to accumulate in the morning. These clouds are brought from the sea and are apparently driven inland. We have been informed by the inhabitants that rain usually tends to fall in Hadhramaut in general during the night. We have actually experienced this after mid-night both in coastal region and inland.

(8) *Hadhramaut Plateau* (September 8th-9th, and October 10th-15th, 1936).

This represents a plateau which lies between the coast and the inland wadis of Hadhramaut. It has an average altitude of 1000 metres, though in certain parts which we traversed, it rises to nearly 1500 metres. It is vastly different, however, from the Yaman plateau in that it represents an arid region. This is due to the fact that it has much less rainfall and is composed entirely (or almost entirely) of limestone. Its lesser rainfall may be due to the fact that it has a lower altitude and lies to the East of the Yaman plateau. Its limestones are in many places underlain by sandstones, and it hardly has any vulcanic rocks (apart from dispersed areas of recent lavas). Parts of the plateau are dissected by dry wadis cut either by former rainfall or by wind and sub-aerial erosion. Vegetation seems to be practically limited to the bottoms and sides of these wadis. During our journey

over the plateau climatic conditions seemed to show modified desert type. But we may note in particular that on one occasion minimum temperature fell to 4.7° C. (at Ba-Salih, October 13th, on the Do'an-Makalla road). The drop of temperature at night usually led to an increase in relative humidity and to the formation of exceptionally heavy dew. This cannot fail to have its effect upon vegetation.

(9) *Wadi Hadhramaut* (September 10th-October 3rd, 1936).

The main wadi of Hadhramaut is deeply cut in the limestone plateau and runs chiefly in an West-East direction. Its bottom lies at about 740 metres at Horeidah (the western most point reached by our expedition) and slopes gradually eastwards until it reaches 490 metres at Qabr Hûd. It is shut in by two walls rising more or less for about 250-300 metres. Climatic conditions in the bottom of the wadi are naturally affected by relief. Torrents occasionally run over the surface of the bottom of the wadi, but permanent surface waters are only found in its eastern part (from near Soom eastwards, though they percolate again under the sands before reaching the sea). In the upper parts of the wadi, on the other hand, there seems to be a permanent subterranean stream running from West to East, and exploited at various spots by wells feeding the oases.

As for climatic conditions of the wadi, we have noted during our stay that although we were in September the climate was very hot and dry. It is interesting, however, to note that the maximum temperature was not usually reached until 3.30 p.m. This may be due to the existence of subterraneal humidity in the soil of Wadi Hadhramaut leading, especially in oases areas, to relatively slow heating of earth and slow emission of heat into the air. It may be that this is also the reason for the fact that the temperature does not fall too much or too quickly at night, thus leading to less diurnal range than would have been expected in true desert climate. But at any rate, it is quite clear that the air is dry in Hadhramaut (see Table I). As for the wind system, it appears to be affected by relief and by the main direction of the wadi. Owing to the apparent movement of the sun northwards and then southwards over the wadi, there is of course a change in the prevailing winds. In spring and early summer, southerly (South, South-West, or South-East) winds gain in strength, but we have been informed by the inhabitants that if we consider the year as a whole, North-East, East, and South-East winds are more prevalent. We have been further informed that, at least during late summer, it is the easterly winds that are accompanied by rain. Westerly winds during that season are not welcome for agriculture. We may further infer that although the main source of humidity (leading to rainfall) is either in the South or the South-East, the blowing of wind from the North or North-East provides a re-

latively cold front which helps condensation and leads to rain. It may be further stated that on the whole, rain is more common during the months extending from March to September with slight increase in early and late summer. But in fact, the wind and rain systems of Wadi Hadhramaut are rather complicated owing to various reasons of which we may count the following :

(a) The effect of the deep cut wadi and its tributaries upon the direction of wind.

(b) The situation of Wadi Hadhramaut between the desert in the North and the sea in the South and South-East (thus being different from Yaman which has the desert to its North-East and the sea to its South and West).

(c) The probable meeting of different temperature fronts over Wadi Hadhramaut : a relatively cold and dry front on the one hand, and a wet and rather warm one on the other. It is possible that in early and late summer the meeting of the two fronts takes place over Hadhramaut itself, while in middle summer the low pressure over the desert of Rub' Al-Khali to the North drags southerly winds inland, so that the humidity is dissipated in the dry air of the desert.

Another interesting feature in the climate of Wadi Hadhramaut are the so-called « *Haboub* » or sand-storms which occur in the afternoon. These are different from the « *Ghoba* » of the Yaman Tihamah and the « *Dju'farah* » of the Yaman plateau, in that both of these latter are real and high dust-storms and are more frequent in the summer. In Hadhramaut, on the other hand, the « *Haboubs* » play chiefly on the sands lying at the bottom of the wadi and are apparently more frequent in winter. They come from the so-called « Nadjdi » direction, for example East-North-East (or generally eastward) direction. We may also notice that they are not necessarily accompanied by light temperature.

(10) *Wadi Do'an* (October 4th-10th, 1936).

This is one of the main tributaries of the Wadi Hadhramaut. It runs more or less in a South-North direction and bouches into the upper Wadi Hadhramaut. It thus runs more or less at right angles to the main wadi. It slopes from about 1000 metres near Khureibah in the South to about 730 metres near Al-Mashhad in the North. Its climatic conditions are somewhat different from those of Wadi Hadhramaut as the Do'an lies further South, runs in South-North direction and cuts through a somewhat higher plateau. It is also a much narrower wadi than that of Hadhramaut though its walls have approximately the same height (300 metres). It is also much richer in vegetation and cultivation — certain parts of its bottom representing immense and continued oases. It benefits not only by its local rainfall but aslo by torrents descending to it from the high plateau espe-

cially towards the end of summer. We have been informed by the inhabitants that the year may be divided into four seasons, each lasting for 3 months, as follows :

(a) The first season (which the local inhabitants call the spring), starting towards the end of December. It is the coolest of all seasons and is characterised by northerly wind. Sometimes however, southerly wind blows and may bring rain.

(b) The second season (which the inhabitants call the summer) starting end of March. Wind is variable and sometimes there are ascending columns of air owing to local heating. This may lead to storms. Rain in this season is due to south-easterly wind.

(c) The third season (which the inhabitants call the autumn) starting end of June. This is the rainiest season of all. Wind is entirely southerly, but rain does not occur except if it is met by northerly wind.

(d) The fourth season (which the inhabitants call the winter) starting end of September. Wind is usually northerly and dry, but if it blows from the East it brings violent rain. This latter case may happen once or twice in the season.

GENERAL SUMMARY AND CONCLUSIONS

We may now try to sum up the main conclusions of the regional survey we have attempted to outline in the light of the records taken and information collected. Of course, it would be far from safe to draw definite and far reaching conclusions from the study of a single season in a little known country as South-West Arabia. It is well known that in order to establish the main system of climate in a given region, one has to rely on records of observations taken at a number of fixed stations and extending over a period of no less than 10 years. Our records, on the other hand, are not only fragmentary and incomplete, but they have also been taken at a large number of localities during our journey. The conclusions we draw from them and from whatever information we have been able to collect in the field must, of course, be considered as entirely tentative and preliminary. With this reservation in mind, we may conclude that taken as a whole South-West Arabia has a semi-monsoonal climate modified in cetrain places by the interaction of semi-desert conditions. But we should also draw the difference between Yaman and Hadhramaut — the former exhibiting a more semi-monsoonal type and the latter a more semi-desert or desert one. Even within Yaman, the low-lying coastal plain of Tihamah is vastly different from the high plateau. Tihamah is a hot, almost rainless country, but with high relative humidity. Yaman plateau is the « Arabia Felix » *sensu stricto*. Its highlands attract moisture drawn chiefly from the South-

West (though perhaps partly also from South-East ?). It appears however, to have a complicated system of wind which promotes the meeting of relatively cold fronts with warm ones. As we have seen, rains in certain parts of the season may be actually occasioned by northerly winds. Nothing can be said with absolute certainty about this complicated system before complete records and observations about the pressure and wind regime over the whole of Arabia and East Africa are available. The difficulties are also increased by the fact that climatic conditions in various parts of Yaman are very much affected by local relief (altitude, direction of valleys, etc.). This is illustrated chiefly by the study of temperature and, more especially, of rainfall in various parts of the plateau.

Perhaps the rainiest part of the plateau lies in the South-West corner of its main highlands (North and North-East of Ta'iz), confronting the South-West monsoons. The yearly total rainfall in this area may be roughly estimated at 70-80 cms., though it is possible that there may be some clear variation from year to year. The San'aa region has about 40-45 cms., but as we mentioned before it lies further East and in what may be called as the rain shadow area of the highlands lying West of it. As a general rule rainfall decreases in Yaman as we go towards the East and North. As for the season of precipitation, it falls in the summer months with two submaxima in early and late summer. In this respect, South-West Arabia is vastly different from the rest of the peninsula. Northern Arabia has mediterranean winter rainfall, while Nadjd and Hidjaz have true desert, for example irregular rainfall. Thus from a climatological point of view (as also in other general geographical respects), South-West Arabia, especially Yaman, is more linked with East Africa than with the rest of Arabia.

As for Hadhramaut, our records and information show that it represents a more desert-like region. Its meteorological problems, however, may not be less interesting than those of Yaman. It appears that although the main source of humidity lies to the South, part of the rain may be brought from the South-East. Whatever this may be, we cannot unfortunately decide the total amount of rainfall which must again vary from place to place and also from year to year. Judging from whatever information we could collect, it may be possible to state that, apart from occasional and irregular rainstorms, the average of rainfall cannot much exceed 25 cms. in any part of Hadhramaut. The rainfall of the interior also follows the general rule of decreasing as we advance further North and East.

TABLE I

A Selection from Records of Maximum and Minimum Temperatures and Relative Humidity taken in South-West Arabia at various localities in Yaman and Hadhramaut.

DATE	LOCALITY	ALTITUDE IN METRES	TEMPERATURE IN °C		RELATIVE HUMIDITY
			MAX.	MIN.	
21.IV.1936	Ta'iz	1300	26.0	18.8	28
27. »	»	»	28.8	20.1	41
13.V.1936	Hodeidah	(sea shore)	33.5	29.7	70
19. »	San'aa	2240	22.9	12.2	44
24. »	»	»	24.5	11.9	44
29. »	»	»	26.6	10.6	46
3.VI.1936	»	»	26.0	12.9	46
13. »	»	»	24.8	9.5	31
19. »	»	»	26.2	10.5	38
26. »	Wadi Shira'	1980	33.8	16.9	61
30. »	Na'it	2900	24.7	7.4	63
5.VII.1936	San'aa	2240	26.0	13.5	71
10. »	»	»	26.9	11.9	54
14. »	Amran	2280	25.5	15.7	61
15. »	Wadi Sharis	1080	36.0*	18.0	59*
19 »	»	»	33.2	10.0	49*
23. »	Haddjah	1740	26.0	15.6	56
1.VIII.1936	San'aa	2240	27.6	14.2	51
7. »	Manakhah	1780	24.9	12.8	78*
9. »	Hadjeilah	670	33.9	21.7	61
13. »	Hodeidah	(sea shore)	33.6	26.4	72
3.IX.1936	Shihr	»	30.	26.0	77
12. »	Tareem	700	38.0	29.4	48
18. »	»	»	38.4	27.8	32
22. »	Qabr Hûd	490	35.4	23.0	29
29. »	Sayoun	715	36.8	25.7	34
3.X.1936	Horeidah	740	35.0	22.7	21
6. »	Al-Mashhad	730	35.0	22.0	15
9. »	Khoreibah	1000	32.0	16.5	36*
11. »	Al-Bureirah	1500	32.0	8.3	70*
19. »	Makalla	(sea shore)	33.3	25.3	53
23. »	»	»	31.8	25.1	69

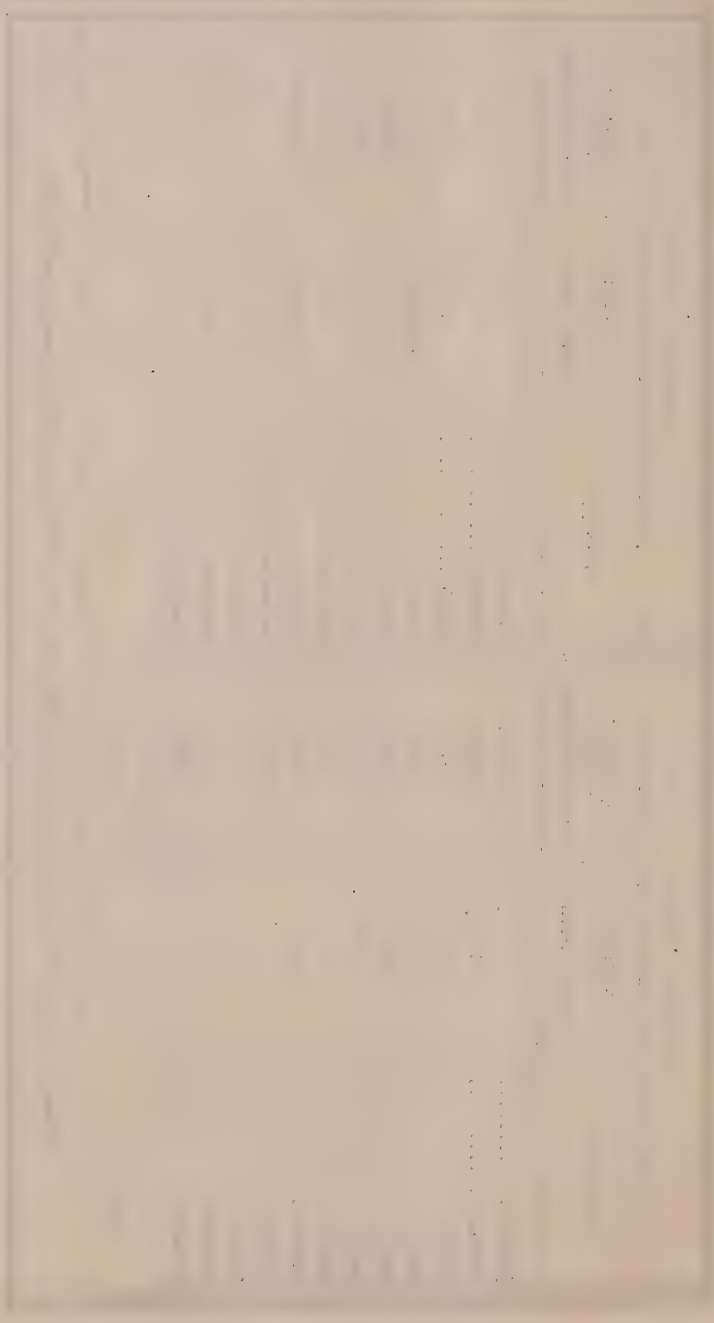
* = Approximate

Table II

Rainfall in San'aa as taken from Records of Government Meteorological Station (San'aa)

YEAR 1935			YEAR 1936		
MONTH	NUMBER OF RAINY DAYS	QUANTITY OF RAIN IN MILLIMETRES	MONTH	NUMBER OF RAINY DAYS	QUANTITY OF RAIN IN MILLIMETRES
January	—	No rain	January	2	11.4
February	1	Drops	February	2	5.7
March	5*	64.7	March	5*	14.7
April	13	124.4	April	No record	No record
May	4**	21.5	May	5	38.9
June	1***	5.3	June	—	No rain
July	3	17.5	July (first half)	6	27.4
August	12	150.5	August	No record	No record
September	—	No rain	September	»	»
October	—	»	October	»	»
November	—	»	November	»	»
December	2	14.6	December	»	»
TOTAL		398.5			

*Towards its end; **No record taken between May 20th-31st; ***No record taken between June 1st-10th.



Revue des espèces égyptiennes du genre *Sphex* Linné, 1758

[Hymenoptera : Sphegidae]

(avec 8 Figures)

par le Dr. A.-M. Honoré

Nos connaissances actuelles sur les espèces du genre *Sphex* qui peuvent se rencontrer dans nos régions, sont suffisantes pour nous permettre d'en établir un compte-rendu, lequel, je l'espère, ne sera pas dénué d'intérêt.

Pour éviter toute confusion par suite des fluctuations survenues dans la nomenclature, j'entends par *Sphex*, l'ancien genre *Sphex* Linné, 1758, et Auctt. mult., défini par l'espèce-type *Sphex flavipennis* Fabricius, 1793, désignation de Latreille, 1810, suivant la décision prise en 1935 par la Commission Internationale de Nomenclature (Cf. Nomenclature et Espèces-types des Genres de Sphégides paléarctiques, in *Bull. Soc. Fouad Ier d'Entom.*, 1943, p. 45).

On a décrit de la vallée du Nil (jusqu'à Khartoum) sept espèces de *Sphex*, et une du Sinaï ; ces huit espèces ont subi des fortunes diverses :

trichargyrius Spinola, 1839 (décrit d'Egypte), méconnu jusqu'à ce jour, mis en synonymie là où il n'avait que faire.

aegyptius Lepeletier, 1845 (d'Egypte), doit changer de nom pour homonymie = *soror* Dahb.

nigropectinatus Taschenb. (de Khartoum), belle espèce demeurée très rare.

bicolor Walker, 1871 (du Sinaï), demeuré longtemps douteux = *regalis* Smith.

eximius Kohl, 1885 (non Lepel., 1845), de Keneh = *Kohli* André = *funereus* Grib. sec. sp. typ.

hirtus Kohl, 1885 (du Caire), assez commun dans le désert Arabique.

leucosoma Kohl, 1890 (du Caire) = *trichargyrius* Spin.

pelopœiformis Dahlb., 1845 (de Khartoum), n'appartient pas à notre faune.

En dehors de ces huit espèces (réduites à six), on a indiqué d'Egypte seize espèces déjà connues d'ailleurs. Onze ont été retrouvées, les cinq autres le seront peut-être un jour : la région Sinaïtique et les bords de la Mer Rouge nous réservent certainement des surprises.

CARACTÈRES DU GENRE

Mandibules non échancrées à leur bord inférieur, avec de une à trois dents à leur bord interne ; ces mandibules de forme variable (fig. 8) : allongées, falciformes, ou coudées, ou encore fortement raccourcies avec de grosses dents.

Yeux gros, entiers, ou insensiblement sinués à leur bord interne, atteignant en dessous la base des mandibules ; bords internes parallèles, ou convergents vers le bas de la tête, rarement convergents vers le haut (*Chlorion*). Ocelles normaux, globuleux.

Ailes antérieures : cellule radiale allongée, arrondie ou vaguement tronquée à l'extrémité, non appendiculée ; trois cellules cubitales, la première très grande, la deuxième plus petite que la troisième ou égale à celle-ci, cette dernière est rétrécie sur la nervure radiale. Les deux nervures récurrentes aboutissent respectivemnt dans la deuxième et la troisième cellule radiales, peuvent aussi être interstitielles (fig. 3), mais dans ce cas, le premier arceau dorsal de l'abdomen est campaniforme. Veine basale aboutissant à la subcosta à une grande distance du pterostigma (fig. 2, 3 et 4).

Ailes postérieures : chez les espèces des sous-genres *Isodontia* et *Sphex* s.str., la nervure basale émerge de l'extrémité même de la cellule sous-médiane, conjointement avec le rameau libre de la nervure médiane (fig. 7A) ; pour la plupart des espèces des autres sous-genres, la nervure basale émerge directement de la nervure médiane, en dehors de la cellule sous-médiane (fig. 7B). Lobe basal très développé.

Pétiole de l'abdomen uniarticulé. Aire pygidiale ♀ absente.

Hanches intermédiaires séparées. Pattes allongées, plutôt robustes, rarement fines, épineuses. Tarses intermédiaires portant deux éperons. Crochets des tarses portant au moins une dent à leur bord interne. Un peigne tarsal chez la femelle, sauf *Isodontia*, et quelques espèces du s.g. *Palmodes*.

Distinction des sexes

Les mâles ont 13 articles au funicule des antennes, les femelles en ont 12 ; elles ont également, dans nos espèces, un peigne tarsal. Elles sont plus grandes et plus fortes que les mâles correspondants.

Coloration

Coloration foncière noire ou rouge, ou les deux en mélange ; assez souvent les bords postérieurs des segments abdominaux sont décolorés ou offrant une bande blanche, nette. Les espèces du sous-genre *Chlorion* ont des couleurs ou tout au moins des reflets métalliques très nets. Parfois, une pubescence argentée, étroitement appliquée, masque la couleur des téguments.

Position systématique et affinités

Le genre *Sphex* Linné forme, avec les genres *Ammophila* Kirby, *Sceliphron* Klug et *Neosphex* Reed (*Pseudosphex* Taschenberg Olim), le groupe des *Sphecinae* Auctt., tel que Kohl l'a défini en 1885.

Ce groupement est basé sur les trois caractères suivants : un pétiole abdominal vrai, cylindrique, formé par l'allongement styliforme du premier arceau ventral de l'abdomen, l'arceau dorsal étant généralement plus ou moins campaniforme (ou styliforme chez les *Ammophila* s.str.) ; l'insertion de la nervure basale sur la subcosta est très éloignée du ptérostigma ; la présence de deux éperons aux tibias intermédiaires.

Quelques genres de Pemphredonines ont également un vrai pétiole, mais ce pétiole est caréné, et non pas cylindrique ; l'insertion de la nervure cubitale se fait tout près du pterostigma (fig. 7) ; les tibias intermédiaires n'ont qu'un seul éperon. D'ailleurs, toutes ces Pemphredonines sont de petite taille, max. 12 mm.

Dans le groupe même des Sphegines, la séparation entre *Sphex* et *Ammophila* n'est pas toujours très rigoureuse.

Sphex	*Ammophila*
Deuxième cellule cubitale pas plus grande ou moindre que la troisième.	Deuxième cellule cubitale, en principe, plus grande que la troisième.
Les deux nervures récurrentes aboutissant dans les deuxième et troisième cellules cubitales, ou interstitielles, mais alors généralement les deux en même temps.	Les deux récurrentes aboutissent dans la deuxième cubitale, mais la seconde récurrente peut être interstitielle, elle paraît aboutir dans la trosième cubitale.
Au moins une dent aux crochets des tarses.	En principe, pas de dents aux crochets des tarses, rarement une ou deux dents.

Sceliphron est facile à distinguer par le manque d'épines aux tarses et l'absence de peigne tarsal chez la femelle. *Neosphex* est un genre sud-américain à nervulation très spéciale, réuni par Kohl, en 1890, avec le genre *Sphex*, mais qu'il est bien préférable de maintenir comme genre indépendant.

Subdivisions dans le genre

Le genre *Sphex* est nombreux en espèces, plus de 300, dont 60 environ sont paléarctiques. Le genre a été divisé en sous-genres ou groupes d'espèces, d'importance variable non pas tant par le nombre des espèces, mais surtout par la valeur taxonomique des caractères délimitant certains de ces groupements.

Le genre *Sphex* est loin d'être homogène, à telle enseigne que l'on peut se demander s'il est réellemnt bien indiqué de maintenir dans les limites d'un même genre des groupes de formes aussi disparates que *Chlorion* et *Isodontia* ? Il serait certainement profitable de considérer ceux-ci comme des genres autonomes ; le genre *Sphex*, ainsi allégé, serait beaucoup plus facile à délimiter : il comprendrait deux grandes divisions, *Sphex* s.str. et *Harpactopus*, basées sur la forme de la deuxième cellule cubitale, et la présence ou l'absence d'un sillon stigmatique au segment médiaire (fig. 1). *Harpactopus* est moins homogène que *Sphex*, mais serait facile à subdiviser par des caractères secondaires.

Enumération méthodique des espèces de SPHEX citées dans ce travail

Sphex (*Chlorion*) *regalis* Smith, *hirtus* Kohl, *funereus* Gribodo, *lobatus* Fabricius, *xanthocerus* Illig. var. *apicalis* Guérin.

Sphex (*Palmodes*) *occitanicus* Lepeletier et Serville.

Sphex (*Calosphex*) *niveatus* Dufour, *nigropectinatus* Dufour.

Sphex (*Parasphex*) *viduatus* Christ, *albisectus* Lepeletier et Serville, *trichargyrius* Spinola, *lividocinctus* Ach. Costa, *nudatus* Kohl.

Sphex (*Harpactopus*) *soror* Smith, *subfuscatus* Dahlbom, *Eatoni* Saunders, *Stschurowskyi* Radoszkowski var. *hyalinipennis* Kohl.

Sphex (s.str.) *pruinosus* Germar, *umbrosus* Christ, *maxillosus* Fabricius. *flavipennis* Fabricius.

Sphex (*Isodontia*) *pelopoeiformis* Dahlbom.

EXPLICATION DES FIGURES

Fig. 1. — Segment médiaire d'un *Sphex* s.str. (schématisé) : *d*, surface dorsale; *c*, côté du segment; *m*, métapleure; *H*, hanche portérieure; *S*, stigmate; *s'*, sillon stigmatique.

Fig. 2. — Aile antérieure de *Sphex subfuscatus* Dahlb., mâle : *B*, aboutissement de la nervure basale sur la subcosta à une grande distance du pterostigma *P* ; *C2*, cellule cubitale plus haute que large, à bords parallèles ; *RI* et *R2*, insertions normales des nervures récurrentes.

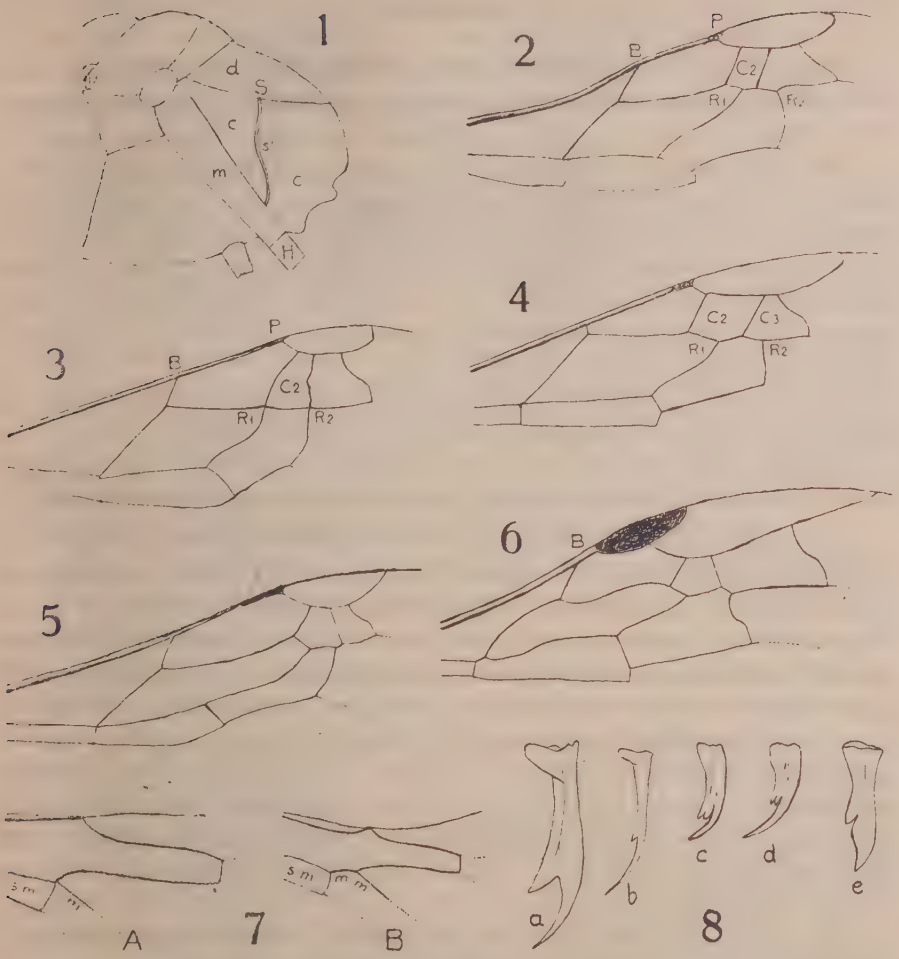


Fig. 3. — Aile antérieure de *Sphex niveatus* Dufour, femelle : *B* et *P*, comme en fig. 2; *C2*, cellule cubitale à bords convergents; *R1* et *R2*, insertions interstitielles des nervures récurrentes.

Fig. 4. — Aile antérieure de *Sphex pruinosus* Germar, mâle : *C2*, deuxième cellule cubitale rhomboédrique ; *C3*, troisième cellule cubitale très rétrécie sur la nervure radiale.

Fig. 5. — Aile antérieure de *Ammophila hirsuta* Scop., femelle : les deux nervures récurrentes aboutissent dans la deuxième cellule cubitale.

Fig. 6. — Aile antérieure de *Psen ater* Fabr., mâle : la nervure basale aboutit à la subcosta très près du pterostigma.

Fig. 7. — Ailes postérieures montrant les points d'émergence de la nervure basale *B* : en A, directement de la cellule sous-médiane (*Sphex* [*Harpactopus*] *furcatus* Scop.); en B, de la nervure médiane, en dehors de la cellule sous-médiane (*Sphex* [*Isodontia*] *paludosus* Rossi).

Fig. 8. — Diverses formes de mandibules : *a*, *Sphex (Chlorion) hirtus* Kohl, femelle; *b*, *Sphex (Chlorion) hirtus* Kohl, mâle : *c*, *Sphex (Parasphex) lividocinctus* A. Costa, femelle; *d*, *Sphex (Parasphex) albisectus* Lepel., femelle; *e*, *Sphex umbrosus* Christ, femelle. — × 7.5.

BIOLOGIE

Les *Sphex* sont de grands chasseurs d'Orthoptères, et pour autant que l'on sache jusqu'à maintenant, des chasseurs exclusifs de cet ordre d'insectes.

La nidification se fait suivant deux modes bien différents, correspondants à un détail d'organisation chez la femelle. Celles qui possèdent un peigne tarsal creusent leurs nids dans le sol plus ou moins dur ; les espèces du sous-genre *Isodontia*, qui n'ont pas de peigne tarsal, et aussi quelques espèces du sous-genre *Palmodes* (1) qui en sont également dépourvues, construisent leurs nids de toutes pièces, maçonnés avec de la boue, ou utilisent des tiges creusées, roseaux, bambous, etc.

En principe, la femelle ne creuse qu'un seul nid à la fois et le garnit d'une proie de taille appropriée ; mais il y a des exceptions : Ferton a vu un *Sphex albisectus* Lepel. creuser et approvisionner trois nids en même temps, et l'un de ces nids contenait deux larves de criquets au lieu d'une.

Les proies sont invariablement des Orthoptères : grillons, criquets ou sauterelles ; chaque espèce de *Sphex* a sa proie préférée, mais ce serait une erreur de croire que ce choix est strictement déterminé, comme Fabre voulait le faire admettre d'après des observations insuffisantes : si la proie normale vient à manquer, le chasseur se rattrape sur une autre espèce. On a même observé que d'une région à l'autre, un *Sphex* pouvait changer de proie (ceci demanderait confirmation) : *Sphex subfuscatus* Dahlbom capture normalement *Caloptenus italicus*, mais on l'a trouvé aussi avec *Oedipoda coerulescens* (d'après Ferton), et même *Dociostaurus maroccanus* (d'après Vayssière) ; *Sphex maxillosus* Fabr. capture des Locustaires, mais aussi des Grillons (Picard). L'œuf est déposé généralement entre les hanches, ou à la base de l'élytre.

La nymphose a lieu dans une coque solide, formée de plusieurs enveloppes : l'extérieure est souple et soyeuse, l'intérieure, qui contient la nymphe, est une sorte d'étui de laque plus ou moins rigide.

TABLES POUR LA DÉTERMINATION DES ESPÈCES

Femelles

1. Ongles des tarses munis d'une seule dent aiguë au milieu de leur bord interne. Bord postérieur du pronotum épaissi, tuberculé de chaque côté d'un sillon médian. Bord antérieur du clypeus denticulé (*Chlorion*) .. 2

(1) *S. strigulosus* Costa, 1858, et *S. argyrius* Brullé, 1832, tous deux du littoral méditerrannéen nord, depuis l'Espagne jusqu'en Asie Mineure.

—. Ongles des tarses munis de deux à quatre dents à la base de leur bord interne. Bord postérieur du pronotum sans sillon médian, non bituberculé. Bord antérieur du clypeus non denticulé 4

2. Ailes antérieures enfumées, à reflets violacés. Cinq dents très nettes au bord antéreur du clypeus. Longueur 24 mm. ..... *regalis* Smith

—. Ailes antérieures jaunes, à bordure apicale brune 3

3. Quatre dents au bord antérieur du clypeus. Ailes postérieures jaunâtres sans bande brune. Striation transversale de l'aire dorsale du segment médiaire plus nette. Pubescence presque nulle. Tête et thorax plus ou moins rouges ..... *funereus* Gribodo

—. Cinq dents, dont la médiane est petite, au bord antérieur du clypeus. Les quatre ailes bordées de brun. Striation transversale de l'aire dorsale du segment médiaire grossière. Pubescence noire fournie. Tête et thorax avec quelques taches rougeâtres ..... *hirtus* Kohl

4. Deuxième cellule cubitale nettement plus haute que large (fig. 2 et 3). Pas de sillon stigmatique sur les côtés du segment médiaire 5

—. Deuxième cellule cubitale aussi large que haute, de forme rhomboédrique (fig. 4). Un sillon stigmatique sur les côtés du segment médiaire (fig. 1) (*Sphex* s. str.) 14

5. Ongles des tarses avec deux dents obtuses à la base de leur bord interne 6

—. Ongles des tarses avec trois ou quatre dents à la base de leur bord interne (*Parasphex*) 11

6. Abdomen ferrugineux-clair, les bordures des segments offrant une bande marginale jaunâtre. Postscutellum plan ou bombé, mais sans protubérance nette en son milieu. Clypeus plan. Pubescence du thorax blanche, appliquée, très fournie, masquant les téguments (*Calosphex*) 7

—. Abdomen noir, sans bandes marginales claires. Postscutellum présentant un tubercule médian saillant. Clypeus bombé. Pubescence généralement noire, hérissée. Premier tergite inséré à angle droit sur le pétiole (*Harpactopus*) 8

7. Deuxième cellule cubitale non rétrécie sur la nervure radiale. Tarses antérieurs à pilosité foncée. Pétiole plus court que les deux premiers articles du funicule des antennes réunis. Longueur 20-25 mm. .... *nigropectinatus* Dufour

—. Deuxième cellule cubitale nettement rétrécie sur la nervure radiale (fig. 3). Tarses antérieurs à pilosité blanchâtre ou brun-clair. Pétiole égalant les deuxième et troisième articles du funicule réunis. Longueur 16-18 mm. ..... *niveatus* Duf.

8. Ailes antérieures incolores ou enfumées. Prothorax et mésonotum couverts d'une pubescence appliquée, argentée, masquant les téguments. 9

—. Ailes antérieures jaunes, rembrunies sur les bords. Pubescence du thorax noire ou grisâtre, entièrement hérissée 10

9. Ailes antérieures incolores sur le disque, avec les veines épaissies, et enfumées au bord apical ; ailes postérieures hyalines. Pattes antérieures longuement ciliées, le peigne tarsal formé de quinze à vingt soies longues et flexibles. Segment médiaire très rugueux. Pronotum et mésonotum argentés. Longueur 33 mm. .... *Stschurowskyi* Rad. var. *hyalinipennis* Kohl

—. Ailes enfumées sur toute leur surface, à reflets violets, le bord postérieur des ailes inférieures plus clair. Peigne tarsal formé de huit à dix cils raides, entremêlés de quelques poils flexibles, plus courts. Segment médiaire couvert de stries transversales arquées, un peu confuses par suite d'une ponctuation qui domine sur le milieu du dos du segment. Tête argentée comme le pronotum et le mésonotum. Longueur 34 mm. ...., *Eatoni* Saund.

10. Deuxième cellule cubitale rétrécie sur la nervure radiale. Pattes robustes, fortement épineuses, surtout aux tarses, où les épines ordinaires sont entremêlées d'autres plus fortes. Thorax couvert d'une pilosité noire, plus touffue sur le segment médiaire. Longueur 28-40 mm. .... *soror* Dahlbom.

—. Deuxième cellule cubitale non rétrécie, à bords paarllèles (fig. 2). Pattes à spinulation normale. Pilosité du thorax d'un gris blanchâtre, non particulièrement touffue au segment médiaire. Longueur 15-20 mm. .. .. *subfuscatus* Dahlb.

11. Scutellum plat, sans sillon médian. Bords des tergites décolorés. Ailes légèrement jaunâtres. Crochets des tarses avec quatre dents au bord interne. Longueur 15-20 mm. ..... *lividocinctus* Costa

—. Scutellum plus ou moins bossu, avec un sillon médian 12

12. Crochets des tarses avec quatre dents. Noir, abdomen rouge clair avec les bords des segments décolorés. Une pubescence argentée, appliquée, dense, masquant la sculpture des téguments, couvre la tête, le thorax, le segment médiaire, les deux premiers arceaux de l'abdomen et les pattes. Longueur 15-18 mm. ..... *trichargyrius* Spinola

—. Crochets des tarses avec trois dents. Noir, abdomen rouge avec les derniers segments de l'abdomen noirs ou tachés de noir. Pilosité dressée blanche ou noirâtre 13

13. Abdomen rouge, les deux ou trois derniers segments tachés de noir en dessus. Pubescence blanche, assez dense sur la tête, le thorax et les pattes ; au segment médiaire, un espace dénudé en forme de lyre. Longueur 18-24 mm. ..... *viduatus* Christ

—. Abdomen avec les deux premiers segments rouges ; les quatre ou cinq premiers segments offrent à leur bord terminal une mince bande de couleur ivoire (dans les exemplaires d'Egypte, ces bandes sont plus ou moins effacées). Pubescence blanchâtre, moins fournie que chez *viduatus* Christ. ; le segment médiaire sans espace dénudé. Longueur 14-18 mm. ..... *albisectus* Lep. et Serv.

14. Segment médiaire offrant 7 à 8 crêtes transversales bien visibles sous la pubescence cotonneuse blanche qui recouvre le thorax. Ailes hyalines, les antérieures rembrunies à l'apex. Noir, abdomen rouge avec les derniers segments noirs, ou entièrement rouge (var. *scioensis* Grib.). Pattes en partie rouges. Longueur 20-28 mm. ..... *pruinosus* Germar

— . Segment médiaire finement striolé en travers, sans crêtes proéminentes bien visibles 15

15. Ailes hyalines, marquées à la base d'une tache brun foncé ; le bord apical des ailes antérieures est également rembruni. Postscutellum portant deux petites protubérances coniques séparées par un sillon profond. Noir, fémurs postérieurs rouges. Pubescence générale d'un gris foncé, noire et touffue sur le segment médiaire. Longueur 24-34 mm. .... *umbosus* Christ var. *metallicus* Taschenberg

— . Ailes plus ou moins jaunes, sans taches noirâtres à la base, enfumées à leur bord apical. Sillon médian du postscutellum peu marqué, les petites protubérences à peine indiquées 16

16. Ailes d'un gris jaunâtre, leur partie apicale plus claire. Face couverte de poils argentés. Longueur 20-26 mm. ..... *maxillosus* Fabr.

—. Ailes nettement jaunes, leur bord apical plus foncé. Face couverte de poils appliqués généralement dorés. Longueur 29-33 mm. .... *flavipennis* Fabr.

Mâles

1. Ongles des tarses avec une dent aigüe au milieu de leur bord interne. Bord postérieur du pronotum épaissi, bituberculé par la présence d'un sillon médian (*Chlorion*) 2

—. Ongles des tarses avec deux ou plusieurs dents obtuses à la base de leur bord interne. Bord postérieur du pronotum sans sillon médian 4

2. Ailes antérieures enfumées, à reflets violacés. Segment médiaire finement et densément strié en travers, les stries demeurant nettement séparées à la base du segment. Tête, antennes et pattes (sauf les fémurs) rougeâtres, le reste du corps est d'un bleu brillant à reflets violets. Longueur 14-16 mm. ..... *regalis* Smith

—. Ailes antérieures jaunes, avec le bord apical noir 3

3. Pubescence bien fournie sur la tête et le thorax. Ailes postérieures avec les bordures apicales et postérieures brunes. Longueur 28-30 mm. .... *hirtus* Kohl

—. Pubescence clairsemée, à peu près nulle sur les mésopleures. Ailes postérieures sans bordures colorées en brun. Longueur 26-28 mm. .... *funereus* Grib.

4. Deuxième cellule cubitale nettement plus haute que large. Pas de sillon stigmatique au segment médiaire 5

—. Deuxième cellule cubitale à peu près aussi large que haute, de forme rhomboédrique. Un sillon stigmatique sur les côtés du segment médiaire (fig. 1). (*Sphex* s. str.) 14

5. Ongles des tarses avec deux dents à la base de leur bord interne 6

—. Ongles des tarses avec trois à quatre dents à la base de leur bord interne (*Parasphex*) 11

6. Abdomen d'un ferrugineux clair, les bordures des segments offrant une bande marginale plus claire bien visible. Postscutellum plan, sans tubercule médian. Clypeus plan. Pubescence du thorax blanche, brillante, appliquée, masquant les téguments (*Calosphex*) 7

—. Abdomen noir, sans bandes marginales claires. Postscutellum avec un tubercule plus ou moins aigu. Clypeus bombé. Pubescence généralement noire, ou grise, dressée (excepté *Eatoni* Saund.). Premier tergite inséré, à angle presque droit sur le pétiole (*Harpactopus*) 8

7. Deuxième cellule cubitale non rétrécie sur la nervure radiale. Tarses antérieurs à pilosité noirâtre. Pétiole plus court que les fémurs postérieurs, égalant les deuxième et troisième articles du funicule réunis. Longueur 15-25 mm. ..... *nigropectinatus* Duf.

—. Deuxième cellule cubitale distinctement rétrécie sur la nervure radiale. Tarses antérieurs à pilosité blanchâtre ou brun-clair. Pétiole aussi long que les fémurs postérieurs, égalant les quatre premiers articles du funicule des antennes. Longueur 15-16 mm. ..... *niveatus* Duf.

8. Mesonotum couvert de poils argentés, appliqués, masquant les téguments ; le restant de la pilosité est noir. Ailes enfumées avec un fort reflet violacé ; ailes inférieures éclaircies à leur marge postérieure. Longueur 22 mm. ..... *Eatoni* Saund.

—. Pilosité noire ou grisaille, hérissée 9

9. Ailes antérieures hyalines à bords rembrunis, ailes postérieures entièrement hyalines. Face couverte de poils argentés, entremêlés de poils noirs dressés. Longueur 18-22 mm. ..... *Stschurowskyi* Rad. var. *hyalinipennis* Kohl

—. Ailes d'un jaune plus ou moins prononcé, les bords apicaux rembrunis 10

10. Deuxième cellule cubitale rétrécie sur la nervure radiale Clypeus très bombé, proéminent. Pattes robustes, les épines ordinaires des tarses entremêlées d'autres plus fortes. Longueur 22-28 mm. .... *soror* Smith

—. Deuxième cellule cubitale non rétrécie sur la nervure radiale. Clypeus moins renflé. Epines des tarses non entremêlées d'autres plus fortes. Longueur 11-18 mm. ..... *subfuscatus* Dahlb.

11. Quatre dents aux ongles des tarses. Abdomen rouge 12

—. Trois dents aux ongles des tarses. Abdomen rouge plus ou moins marqué de noir 13

12. Scutellum plat, mat, sans sillon médian. Pubescence d'un gris blanchâtre assez fournie, mais non étroitement appliquée. Longueur 14-16 mm. ..... *lividocinctus* Costa

—. Scutellum présentant deux tubercules brillants. Pubescence argentée dense, entremêlée de nombreux poils blancs dressés. Longueur 12-15 mm. ..... *trichargyrius* Spinola

13. Abdomen presqu'entièrement rouge, avec des taches noires sur les quatrième et cinquième segments. Longueur 14-20 mm... *viduatus* Christ

—. Abdomen noir, les deux premiers segments rouges ; tous les segments à partir du deuxième portent une mince bordure d'un blanc d'ivoire, plus ou moins nette. Longueur 13-16 mm. ..... *albisectus* Lep.-Serv.

14. Corps entièrement noir 15

—. Abdomen en partie rouge 16

15. Ailes hyalines, avec une tache basale noirâtre. Longueur 21-25 mm. ..... *umbrosus* Christ var. *metallicus* Taschenberg

—. Ailes hyalines, sauf le bord apical qui est enfumé. Longueur 20-24 mm. ..... *pruinosus* Germar

16. Longueur 16-20 mm. ..... *maxillosus* Fabr.

—. Longueur 22-28 mm. ..... *flavipennis* Fabr.

REVUE DES ESPÈCES DU GENRE SPHEX EXISTANT EN ÉGYPTE OU SIGNALÉES DE CE PAYS

1. Sphex (Chlorion) regalis Smith, 1873.

Chlorion bicolor Walker, 1871 (non Dahlbom, 1845, nec Saussure, 1869) ; *Chlorion superbum* Radoszkowsky, 1887 ; *Sphex* (*Chlorion*) *regalis* [Kohl p.p.], 1890.

♀ : Longueur 18-22 mm. — D'un noir bleu à reflets violacés très brillants ; la tête, les antennes, le bord postérieur du pronotum et les pattes, moins les fémurs, d'un roux vif ; mandibules rougeâtres. Ailes entièrement enfumées, à reflets violets.

Pubescence clairsemée : quelques poils noirs sur les tempes, le mesonotum et la face postérieure du segment médiaire.

Clypeus bombé en toit, avec l'indication d'une arête médiane, peu ponctué, brillant, son bord antérieur muni de cinq dents relevées, mousses. Mandibules falciformes, avec une forte dent au milieu de son bord interne. Yeux parallèles, largement séparés sur la face ; tempes bien développées derrière les yeux. Bases des antennes séparées par un espace égal à celui qui les sépare du bord interne des yeux ; deuxième article du funicule moins long que les troisième et quatrième réunis. Bord antérieur du pronotum abrupt en avant, strié transversalement sur la face antérieure et sur la partie déprimée, nettement bi-gibbeux en dessus, brillant. Mesonotum et scutellum très brillants, éparsement ponctués, avec une ponctuation très fine sous-jacente ; postscutellum indistinctement rebordé en avant, éparsement ponctué, avec un sillon médian. Mésopleures assez brillantes, avec une double ponctuation.

Aire dorsale du segment médiaire grande, deux fois plus longue que large, creusée d'une gouttière médiane peu profonde, et finement rebordée au bord postérieur. Aire recouverte de fines côtes transversales très serrées, nettement délimitées même en avant près de la base du segment, où elles sont un peu cintrées et se continuent en biais sur les côtés du segment. Face postérieure du segment verticale, couverte de crêtes transversales plus fortes que celles de la face dorsale.

Pétiole court, plus petit que la moitié de la longueur des fémurs postérieurs. Abdomen d'un bleu foncé brillant, très finement ponctué, les deux derniers arceaux dorsaux fortement ponctués à la base.

Pattes fines ; leur spinulation légère, clairsemée. Peigne tarsal formé de six à sept cils raides, assez courts et régulièrement espacés.

♂ : Longueur 16-17 mm. — Semblable à la femelle, les gibbosités du pronotum noires.

Egypte : Route de Suez (Km. 94), Waid Um Assad, Wadi Hoff (Juillet-Octobre).

Aire géographique : Egypte, Arabie, Asie centrale et méridionale.

2. Sphex (Chlorion) funereus Gribodo, 1879.

Sphex eximius Kohl, 1885 (non Lepeletier, 1845) = *Sphex Kohli* André, 1888, nov. nom. ; *Sphex* (*Chlorion*) *regalis* Smith (Kohl, p.p., 1900).

La synonymie *Kohli* André = *funereus* Gribodo, sec. spec. typ. est dûe à Kohl lui-même (1895, p. 43) ; Kohl dit encore avoir vu, de cette même espèce, des individus du sud de l'Arabie communiqués sous le nom de *melanostoma* Smith (Magretti). *Sphex* (*Chlorion*) *melanostoma* Smith, 1856, ♀, est une espèce indienne, probablement synonyme de *Sphex* (*Chlorion*) *splendidus* Fabr., 1804, ♂.

Je ne connais pas de visu cette espèce, décrite par Kohl comme provenant d'Egypte et du Soudan.

Voici la traduction in extenso de la description donnée par l'auteur :

Longueur : ♂, 26-28 mm. ; ♀, 30-34 mm.

♀ : Noirâtre, à reflets bleus ou d'un bleu violet ; tête et thorax plus ou moins d'un rouge brunâtre. Thorax et abdomen presqu'entièrement glabres. Ailes jaunes, le bord apical des antérieures d'un brun-noirâtre ; cette couleur, nettement délimitée, s'étend jusqu'aux cellules radiale et troisième cubitale ; les ailes postérieures sont hyalines au bord apical et sur la marge postérieure.

Partie médiane du clypeus sans impression, munie de quatre dents mousses, nettes. Deuxième article du funicule à peu près aussi long que les deux suivants pris ensemble. Tête fortement élargie derrière les yeux. Collier nettement rétréci vers le haut, déprimé en son milieu, son bord antérieur avec des stries transversales arquées. Dorsulum et mésopleures assez brillants, avec des points isolés avec d'autres plus petits. Postscutellum sans tubercule médian. Segment médiaire allongé, couvert en dessus de stries transversales minces, qui se prolongent verticalement sur les côtés. Peigne tarsal bien développé, formé de sept cils. Plaque ventrale du segment anal ne dépassant guère la plaque dorsale. Insertion des nervures récurrentes normales. Troisième nervure transverso-cubitale très rapprochée de la seconde.

♂ (que j'admets comme tel) : Comme la femelle pour la couleur des ailes, les insertions des nervures et la sculpture du thorax ; mais les antennes sont en grande partie (toujours ?) d'un jaune orangé, le deuxième article du funicule est beaucoup plus court que le troisième, à peine aussi long

que le premier et le quatrième pris ensemble ; la tête est beaucoup moins renflée derrière les yeux (²).

Kenneh (Frauenfeld), Soudan (Natterrer) [ex Kohl] ».

Cette espèce se rencontrera peut-être en Haute-Egypte, sur la rive droite du Nil ; aussi dans la zone de la Mer Rouge.

3. Sphex (Chlorion) hirtus Kohl, 1885, ♂ ; 1890, ♂ ♀.

♀ : Longueur 30-33 mm. — Coloration noire, avec, sur l'abdomen un reflet métallique à peine sensible. Antennes rouges, les trois ou quatre derniers articles noirs. Face et dessus de la tête avec quelques taches d'un brun-rouge. Tibias et tarses de cette même couleur. Ailes jaunes, l'extrémité apicale des quatre ailes, et la bordure postérieure des ailes inférieures brunâtres ; la largeur de cette bordure est variable.

Pubescence noire, dressée, assez touffue sur la tête, le prothorax, les mésopleures et les côtés du segment médiaire, clairsemée à la base des pattes, absente ailleurs.

Clypeus bombé en forme de toit, avec l'indication d'une arête médiane, le bord antérieur muni de cinq dents, quatre fortes dents mousses, avec une cinquième médiane, plus petite, plus aiguë. Mandibules avec une forte dent au milieu de leur bord interne. Yeux parallèles, leur bord interne très légèrement concave dans la moitié supérieure ; face moins large que chez *regalis* Smith. Bases des antennes largement écartées ; deuxième article du funicule long, presqu'égal aux deuxième et troisième réunis. Tête assez épaisse derrière les yeux.

Pronotum abrupt en avant, sa face antérieure sillonnée en travers ; le dessus portant deux gibbosités très nettes, quelque peu ponctuées, avec les côtés sillonés.

Mésonotum ponctué, à ponctuation effacée sur le disque et en arrière renforcée et très serrée sur les côtés devant les écailles alaires. Mésopleures densément en finement ponctuées. Scutellum plan, trapézoïdal, avec une ponctuation extrêmement fine, entremêlée de quelques points isolés plus gros. Postscutellum légèrement bombé, sans impression médiane, finement ponctué comme le scutellum. Cette même ponctuation très fine couvre également la partie postérieure du mesonotum qui est privée de gros points : elle laisse à la surface du mesonotum un certain brillant.

Aire dorsale du segment médiaire très grande, deux fois aussi longue que large, légèrement élargie en arrière, et presqu'entièrement rebordée

(²) Au sujet de la longueur du deuxième article par rapport au troisième, il y a contradiction entre le texte de la table de détermination (1885, p. 169), où il est dit : « Zweites geiselglied langer als das dritte », et le texte descriptif de l'espèce (p. 175), comme il est traduit ci-dessus.

par une crête très visible, cette bordure entière au bord postérieur, découpée en dents de scie sur les côtés par les crêtes transversales de la surface dorsale du segment passant sur les côtés. Ces crêtes, au nombre de 18 à 20 sont diffuses, anastomosées en avant, tout près de la base du segment, nettes en arrière ; elles se continuent sur les côtés et la face postérieure du segment. Un large sillon en gouttière peu profonde sur toute la longueur de l'aire dorsale.

Pétiole de l'abdomen court, moindre que la moitié des fémurs postérieurs. Abdomen très finement ponctué, les derniers segments dorsaux mats ; le dernier sternite ne dépassant pas le tergite correspondant.

Spinulation des tarses pas très forte, clairsemée. Peigne tarsal formé de sept cils.

Nervulation normale. Troisième cellule cubitale très rétrécie sur la nervure radiale.

♂ : Longueur 20-24 mm. — Diffère de la femelle par un plus grand développement du système pileux sur la tête, le thorax et le segment médiaire, doublé par places d'un feutrage grisâtre sous-jacent. Tête noire, sans taches rougeâtres. Reflets violacés de l'abdomen plus sensibles. Antennes noires avec les trois premiers articles du funicule rouges, le deuxième plus court que le troisième.

Clypeus bombé, arrondi, sans arête médiane, les dents peu visibles. Ailes à bordures brunes mieux marquées. La tête et le thorax sont plus densément et plus fortement ponctués.

Egypte : Désert arabique, assez commun dans les Wadis au Sud-Est du Caire ; route de Suez (Juin à Octobre).

Aire géographique : Nord-Ouest de l'Arabie (côtes de la Mer Rouge et du Golfe Persique).

En Egypte, pour tous les exemplaires que j'ai pu voir, la coloration est constante ; en Nubie, le rouge envahit les pattes ; dans le sud de l'Arabie, cette couleur s'étend sur la tête et le thorax, comme dans l'espèce précédente.

Il y a certainement beaucoup de rapports entre les deux espèces. Pour les distinguer, on observera, pour la femelle, le nombre des dents au bord antérieur du clypeus ; pour les deux, le développement de la pilosité.

La présence ou l'absence de bandes brunes aux ailes postérieures n'a pas une valeur absolue : chez une femelle de *hirtus* Kohl du Wadi Hoff, ces bandes brunes sont à peine visibles.

4. Sphex (Chlorion) lobatus Fabricius, 1885.

Sphex coerulea Christ, 1791 (non Drury, 1773) ; *Sphex chrysis* Christ, 1791 ; *Chlorion azureum* Lepeletier et Serville, 1825.

Il est bien peu probable que cette espèce se trouve réellement en Egypte ; elle appartient à la Région Indienne. André, 1886, p. 124, prétend posséder un individu étiqueté comme provenant de Cyrenaïque, indication bien peu probante. Je possède un exemplaire femelle que le Dr. Lotte de Por-Saïd m'avait donné il y a quelques années, mais sans aucune indication quant à son origine réelle.

Espèce très reconnaissable : grande taille (35 mm.), glabre, vert ou violet métallique, très brillant ; ailes jaunâtres ; antennes et pattes noirâtres.

5. Sphex (Chlorion) xanthocerus Illiger, 1801, var. apicalis Guérin, 1848.

Sub *Pronaeus*, in Lefebvre, Voyage en Abyssinie, p. 357, 1848.

Cette variété existe d'une façon certaine en Algérie (Vachal), en Tunisie (de Gaulle) et même en Tripolitaine (Mouchez, 1877, Museum de Paris) ; elle pourrait bien se retrouver en Egypte, dans la zone maritime Nord ; peut-être aussi dans l'extrême Sud, vers l'Abyssinie.

Longueur : ♂, 23-33 mm., ♀, 25-35 mm. — Les ailes sont jaunes avec des bordures marginales brunes. Tête, antennes, pattes et dernier segment abdominal ferrugineux ; thorax noir, avec des reflets métalliques violacés, visibles surtout chez le mâle. Les bordures marginales des segments abdominaux ♂ étroitement rousses. Pubescence de la face argentée, à reflets jaunâtres ; celle du pronotum et du mesonotum brune.

Face antérieure du collier du pronotum non sillonné transversalement (pour le distinguer du *S. hirtus* Smith).

Aire géographique : Sous ses différentes variations, l'espèce habite toute l'Afrique à partir du Tropique du Cancer ; la variété *apicalis* Guérin se retrouve en Ouganda et en Afrique du Nord.

6. Sphex (Palmodes) occitanicus Lepeletier et Serville, 1828.

Signalé par Spinola, en 1839, comme ayant été trouvé en Egypte. Il doit y avoir confusion avec une autre espèce : celle-ci est du Midi de l'Europe et de l'Asie occidentale.

A moins qu'il ne s'agisse de la variété *syriaca* Mocsary, 1881, décrite d'Asie Mineure, et retrouvée en Algérie et Tunisie avec d'autres formes très voisines : *puncticollis* Kohl, 1888, et *melanarius* Mocsary, 1883. Dans le groupe *Palmodes*, les espèces sont trop variables pour en dire quelque chose sans avoir sous les yeux des spécimens autochtones.

7. Sphex (Calosphex) niveatus Dufour, 1853, ♂.

Enodia albopectinata Taschenberg, 1869, ♀.

♀ : Longueur 14-16 mm. — Tête, antennes, thorax et segment médiaire noirs ; mandibules jaunes à pointe noire ; pattes jaunes avec les fémurs

rembrunis ; pétiole de l'abdomen noirâtre ; abdomen d'un jaune-roux, les bords postérieurs des segments portant une bande jaune plus claire incisée en rond de chaque côté de la ligne médiane.

Une pubescence d'un blanc soyeux, étroitement appliquée, recouvre la tête, le premier article des antennes, le thorax en dessus et en dessous, le segment médiaire, le premier tergite et les fémurs ; sur l'aire dorsale du segment médiaire, cette pubescence s'éclaircit, laissant voir la sculpture des téguments.

Mandibules falciformes, avec une dent médiane à leur bord intérieur. Clypeus à peine renflé au milieu, son bord antérieur entier, légèrement relevé au milieu, vaguement sinué sur les côtés. Tempes peu développées derrière les yeux ; ceux-ci légèrement divergents vers le bas ; insertions des antennes plus rapprochées entr'elles qu'elles ne sont distantes du bord interne des yeux ; deuxième article du funicule très long, égalant les troisième et quatrième pris ensemble.

Mesonotum finement ponctué, coriacé (observer un coin dénudé). Scutellum renflé, avec un sillon médian net. Face dorsale du segment médiaire finement et densément striée en travers.

Pétiole de l'abdomen plus court que les fémurs postérieurs. Pattes de force moyenne, à épines blanches peu nombreuses, raides, courtes, excepté aux pattes antérieures où elles sont nombreuses, longues et flexibles ; peigne tarsal formé de 7 à 9 de ces cils, blancs, entremêlés de 4 à 5 autres plus raides et jaunâtres. Deux dents à la base du bord interne des crochets des tarses.

Ailes hyalines. La nervulation est un peu spéciale (fig. 3). Les deux nervures récurrentes sont généralement interstitielles, la seconde peut aboutir très légèrement à l'intérieur de la cellule cubitale ; par inclinaison de la première nervure transverso-cubitale vers la deuxième, la deuxième cellule cubitale est rétrécie sur la nervure radiale ; la troisième cellule cubitale est également rétrécie sur la nervure radiale par fléchissement exagéré de la troisième nervure transverso-cubitale vers la deuxième : la cellule cubitale se trouve ainsi, dans sa moitié inférieure, allongée en languette vers le bord apical de l'aile (3).

♂ : Longueur 13-15 mm. — Ressemble beaucoup à la femelle. Pilosité blanche moins bien fournie. Yeux convergents vers le bas ; base des antennes plus rapprochées entr'elles qu'elles ne le sont du bord intérieur des yeux. Deuxième article du funicule plus court, égalant à peine une fois et demie le troisième. Pattes grêles, de coloration plus foncée, peu épineuses. Pétiole

(3) La variété ♀ *senilis* Saunders 1911, décrite d'Algérie, se distingue par le peigne tarsal et les épinoes des tarses noirâtres, le clypeus un peu caréné, et l'impression médiane du scutellum moins profonde.

de l'abdomen plus long que les fémurs postérieurs. Aux ailes antérieures, la troisième nervure transverso-cubitale est presque droite, la cellule a une forme plutôt trapézoïdale.

Egypte : Gebel Asfar, Route de Suez, Abou-Roasch et Massarah.

Aire géographique : Vallée du Nil jusqu'à Khartoum (Taschenberg), Oasis de Koufra, Algérie.

8. Sphex (Calosphex) nigropectinatus Taschenberg, 1869, ♀.

Podium maracandicum Radoszkowski, 1877, ♂.

Superbe espèce ayant tout à fait le facies du *S. niveatus* Dufour précédent, mais plus grand : ♂, 15-20 mm.; ♀, 20-25 mm.. Même coloration d'ensemble, et même revêtement soyeux; les bandes marginales de l'abdomen moins apparentes. Pétiole de l'abdomen plus court que chez *niveatus*, nettement moindre que la longueur des fémurs postérieurs.

Aux ailes antérieures, nervulation comme chez *niveatus*, sauf en ce que la deuxième cellule cubitale n'est pas rétrécie sur la radiale. Peigne tarsal ♀ formé de 8 à 10 cils longs, de coloration plus ou moins foncée.

Egypte : Je n'en connais que deux exemplaires : Wadi Morrah, 27. VIII. 1928 (coll. A. Alfieri).

A été décrit de Khartoum.

Aire géographique : Algérie, Egypte, Nubie, Obock, Sud de l'Arabie (Aden).

9. Sphex (Parasphex) viduatus Christ, 1791.

Sphex fervens Fabricius, 1775 (non Linné, 1758); *Sphex pubescens* Fabricius, 1793; *Enodia canescens* Dahlbom, 1845.

♀ : Longueur 18-24 mm. — Noire, antennes et pattes noires; abdomen rouge, sauf le pétiole et deux taches noires sur les quatrième et cinquième tergites; les bordures des tergites décolorées. Ailes légèrement jaunâtres.

Tête, thorax et fémurs couverts d'une pubescence appliquée, serrée, argentée, couvrant toute la surface du corps; le mesonotum est dénudé sur le disque, ainsi que le scutellum. La pubescence argentée manque également sur la surface dorsale du segment médiaire : une zone glabre, brillante, en forme de lyre borde cette surface dorsale; à l'intérieur de cette zone, la pubescence est remplacée par un feutrage grisâtre, peu visible. Cette disposition remarquable du segment médiaire est plus ou moins visible suivant la taille des individus.

Mandibules fortes, armées d'une forte dent à leur bord interne. Clypeus bombé, son bord antérieur déprimé, l'extrême bord relevé et incisé au milieu. Yeux presque parallèles; les insertions des antennes sont plus rapprochées entr'elles qu'elles ne le sont du bord interne des yeux. Le deuxième

article du funicule égale en longueur les troisième et quatrième réunis. Tempes moyennes.

Le collier du pronotum est abrupt en avant, assez mince, lisse et brillant ; la partie déprimée est ponctuée. Mesonotum brillant, éparsement ponctué ; scutellum et postscutellum bombés, très brillants, avec une ligne médiane commune. La sculpture du dessous du thorax est voilée par la pubescence. L'aire dorsale du segment médiaire est couverte de stries transversales qui, sur les côtés, se perdent sous le revêtement pileux argenté. Une gouttière, large mais peu profonde, partage l'aire dorsale en trois zones faiblement inclinées les unes sur les autres.

Pétiole de l'abdomen plus court que les fémurs postérieurs. Abdomen glabre, brillant, très finement pointillé. Pattes assez robustes, les épines courtes sont blanches, les longues sont foncées en couleur. Peigne tarsal formé de sept à huit cils longs, d'un brun noir. Trois dents aux crochets des tarses.

♂ : Longueur 14-20 mm. — Coloration comme la femelle. Yeux convergents vers le bas. Clypeus plus allongé, le bord inférieur faiblement incisé. Deuxième article du funicule égalant une fois et demie la longueur du troisième. Dessus du thorax envahi par une pubescence blanche, moins dense que chez la femelle, couvrant les espaces qui sont dénudés chez celle-ci.

On rencontre dans les deux sexes des spécimens dans lesquels les taches des quatrième et cinquième tergites peuvent s'étendre et envahir plus ou moins la totalité des derniers segments de l'abdomen.

Egypte : Gebel Asfar, Sakkarah, Mazghouna, Fayoum 53 (Avril-Octobre).

Aire géographique : Toute l'Afrique, Asie Mineure, Indes et Chine.

10. Sphex (Parasphex) albisectus Lepeletier et Serville, 1828.

? *Ammophila Kirbyi* Van der Linden, 1827.

Sphex trichargyra Spinola, 1839, décrit d'Egypte, considéré comme synonyme de *S. albisectus*, par Kohl en 1885 et 1890, ainsi que par Dalla Torre en 1897, est une espèce très valable, facile à distinguer d'*albisectus*, et redécrite par Kohl lui-même, en 1890, sous le nom de *leucosoma*. Voir à l'espèce suivante.

♀. Longueur 14-18 mm. — Noire, mandibules noires avec une tache rouge médiane ; écaillettes d'un brun foncé, avec une vague tache rougeâtre. Les deux premiers et la moitié du troisième tergites de l'abdomen rouges, les deuxième et troisième sternites rouges également ; les quatre premiers arceaux dorsaux sont finement rebordés par une ligne d'un blanc d'ivoire

légèrement élargie sur les côtés, peu visible sur le premier segment rouge. Plaque anale noire. Pattes noires. Ailes hyalines.

Une pilosité d'un blanc-grisâtre, pas très fournie, s'étend sur la tête, le thorax, le segment médiaire, les fémurs et le pétiole de l'abdomen ; cette pubescence se condense en une pubescence blanche, appliquée sur la face, sous la tête et sous les écaillettes, sur les côtés du segment médiaire en arrière.

Mandibules courbes, assez courtes, avec deux dents médianes. Clypeus éparsement ponctué, un peu convexe, son bord antérieur légèrement relevé et sinué en son milieu. Bords internes des yeux convexes dans le bas, convergents en dessous de l'insertion des antennes ; l'espace qui sépare les insertions des antennes est moindre que celui qui les sépare du bord interne des yeux. Tempes normales. Deuxième article du funicule des antennes égale une fois et demie la longueur du troisième lequel est égal au quatrième.

Collier du pronotum assez abrupt en avant, à bord supérieur renflé, arrondi, brillant, éparsement ponctué. Mesonotum assez brillant, à ponctuation éparse, plus serrée et diffuse sur les mésopleures ; scutellum brillant, renflé en bosse et séparé en deux par un sillon médian ; métapleures ponctuées. Sur tout le dessous du thorax, le revêtement argenté rend l'examen de la ponctuation diffifcile : le mesosternum, brillant, est couvert de points gros et espaces.

Segment médiaire finement strié-ponctué sur sa surface dorsale ; les côtés fortement striés en biais dans leur partie antérieure, en arrière les stries sont plus ou moins masquées par une ponctuation surajoutée. Pétiole un peu plus court que les fémurs postérieurs, légèrement cintré.

Prosternum, hanches, trochanters et fémurs des deux premières paires de pattes, brillants, à peine ponctués ; spinulation des tarses moyenne, de couleur claire ; les tarses de la première paire sont garnis de longs poils, le peigne tarsal est formé de 8 à 12 cils. Le bord interne des crochets des tarses porte trois dents.

Ailes antérieures hyalines, à nervures foncées. Deuxième cellule cubitale à peine rétrécie sur la nervure radiale ; insertions des deux nervures récurrentes normales.

♂ : Longueur 13-15 mm. — Semblable à la femelle ; le pétiole abdominal plus allongé, le deuxième article du funicule des antennes n'est que un peu plus long que le troisième.

La description ci-dessus se rapporte à la forme typique de l'espèce, et elle a été établie d'après des spécimens originaires du Midi de la France. En Egypte, comme en Algérie (voir P. Roth, 1928), les bandes blanches, chez la femelle, s'affaiblissent au point de disparaître presque complète-

ment : à peine en reste-t-il quelques traces sur les côtés. La plaque anale inférieure est rouge au lieu d'être noire. La taille est aussi plus grande : elle atteint 19 mm.

Les mâles n'offrent pas de différences d'avec les spécimens typiques d'Europe.

Egypte : Gebel Asfar, Sakkarah, Abou-Roach, Fayoum 53, route de Suez.

Aire géographique : Europe méridionale, Hongrie, Asie Mineure, Afrique du Nord. En Afrique australe, il est remplacé par sa variété *marginatus* Smith, 1856 (Arnold, 1928, p. 351).

11. Sphex (Parasphex) trichargyrius Spinola, 1839.

Cette espèce est restée longtemps méconnue. Kohl (1885 et 1890) et Dalla Torre (1897) l'avaient mise en synonymie de *Sphex albisectus* Lepeletier et Serville, 1828. Ceci était une erreur flagrante : la pilosité argentée très développée et très fournie, la coloration rouge de l'abdomen en entier s'y opposent au premier examen.

On pourrait penser plutôt à *Sphex niveatus* Dufour, 1853 ; celui-ci a le pétiole de l'abdomen plus court, la pilosité argentée est moins étendue, et le dessin des bandes abdominales est tel que Spinola n'aurait pas manqué d'en faire mention.

Les termes de la description de Spinola s'appliquent trait pour trait à un *Sphex* que j'avais longtemps considéré comme devant être le mâle non décrit de *Sphex* (*Parasphex*) *leucosoma* Kohl, 1890, ♀, décrit précisément d'Egypte. Le Dr. A. Mochi et moi avons, à plusieurs reprises, pris les deux sexes ensemble ; l'attribution est donc exacte. *Sphex argyrius* Spinola, 1839, doit être réintégré dans la nomenclature comme espèce valable, avec droit de priorité sur *Sphex leucosoma* Kohl, 1890.

En 1942, dans l'*Introduction à l'Etude des Sphégides*, j'avais admis, sur la foi de W. Schulz (1906), que *leucosoma* Kohl pouvait être une variété de *S. marginatus* Smith, 1856, dont, à ce moment-là, je ne connaissais pas la description. D'autre part, Arnold (1928), pour autant que l'on puisse en juger d'après deux textes discordants (4), paraît être aussi de cet avis. Mais c'est impossible : *marginatus* est, sans conteste, une variété d'*albisectus* ; les deux formes sont très voisines, mais absolument différentes de *leucosoma*, quand cela ne serait que par le nombre de dents aux crochets des tarses : quatre dents chez *leucosoma*, trois chez *albisectus-marginatus*, sans compter les détails de la face, la sculpture du thorax, la pubescence et la coloration.

(4) Dans Arnold, 1928, le Texte de la Table de Détermination, p. 342, est en complet desaccord avec celui de la page 353 (description).

Le septième volume (1838) des *Annales de la Société Entomologique de France* étant devenu extrêmement rare, je crois intéressant de reproduire ici, in extenso, la description de Spinola, parue dans le fascicule 4 (date de publication réelle, 1839), page 466.

« *Sphex trichargyra* n.sp., ♂. — Long. 6 lignes ½, larg. 1 ligne.

Noire. Tête, corselet et pattes couverts d'une fourrure de poils soyeux, blancs et argentés, de moyenne longueur, courbes en divers sens et quelquefois un peu hérissés.

Ecailles et abdomen rouges. Bords postérieurs des cinq anneaux intermédiaires blancs; bandes un peu dilatées sur les côtés. Pétiole du premier anneau de la couleur de l'abdomen, et en faisant à lui seul plus de la moitié de la longueur totale.

Ailes hyalines; nervures rouges; première récurrente s'anastomosant avec la nervure qui sépare les deux premières cubitales. Troisième cubitale très rétrécie antérieurement, recevant la seconde récurrente très près de son angle antéro-interne ».

Voici la description de l'espèce, d'après deux exemplaires, mâle et femelle, capturés ensemble, en Juin 1938, au Gebel Astar.

♀ : Longueur 16-18 mm. — Tête, antennes, thorax et fémurs noirs; mandibules jaunâtres, à pointe noire; écaillettes, tarses, abdomen y compris le pétiole, d'un beau jaune-orangé; les tibias de la même couleur, plus foncés. Bords marginaux des tergites décolorés, de façon à présenter des bandes d'un jaune-miel assez régulières, élargies sur les côtés.

Ailes hyalines, nervures jaunâtres, plus ou moins rembrunies dans la partie centrale.

Une pubescence brillante, argentée, étroitement appliquée couvre la tête, tout le thorax, les deux premiers segments de l'abdomen (en dessus et en dessous), les côtés des troisième et quatrième segments, les hanches, trochanters et fémurs en entier, les faces externes des tibias et des tarses. Cette pubescence est entremêlée de poils blancs, hérissés, plus nombreux sur la tête et les pattes; sur la surface dorsale du segment médiaire, la pubescence appliquée est moins dense, orientée d'arrière en avant, et laisse entrevoir la sculpture des téguments.

Mandibules falciformes, avec une dent fine et aiguë au milieu de leur bord interne. Clypeus bombé au centre, son bord antérieur relevé, entier. Yeux nettement convergents vers le bas de la face. Tempes médiocrement renflées. Base des antennes séparées par un espace moindre que celui qui les sépare du bord interne des yeux; le deuxième article du funicule égalant une fois et demie le troisième, lequel n'est guère plus long que le quatrième. Collier du pronotum non abrupt, renflé-arrondi dans sa partie supérieure. La sculpture de tout le thorax, dessus et dessous, est invisible par suite de

la densité de la pubescence argentée. Le scutellum a un sillon médian peu accusé ; postscutellum légèrement renflé, avec un point central enfoncé.

Aire dorsale du segment médiaire densément couverte de fines carènes transversales, visibles sous le revêtement pileux moins dense à cet endroit ; sur le reste du segment la sculpture est invisible.

Abdomen brillant, couvert d'une ponctuation extrêmement fine. Pétiole un peu plus long que les tibias postérieurs.

Pattes longues et fines, à spinulation clairsemée. Pattes antérieures, y compris les fémurs, garnies abondamment de longs poils soyeux, blancs, entremêlés d'autres poils de couleur foncée ; le peigne tarsal formé d'une vingtaine de ces poils. Quatre dents aiguës au bord interne des tarses.

Ailes antérieures à cellule radiale assez courte ; deuxième cellule cubitale légèrement rétrécie sur la nervure radiale ; la troisième cellule cubitale fortement rétrécie. La première nervure récurrente interstitielle, la seconde récurrente aboutit plus ou moins près de l'insertion de la seconde nervure transverso-cubitale.

♂ : Longueur 13-14 mm. — Allure générale de la femelle, comme coloration et pubescence ; celle-ci, cependant, moins bien fournie et plus laineuse, laisse apercevoir les téguments sous-jacents.

Clypeus bombé au centre, allongé, dépassant notamment par le bas une ligne imaginaire reliant le bord inférieur des yeux. Antennes à articles plus courts, le deuxième n'étant que le double du premier, tout en demeurant plus long que le troisième et le quatrième. Pétiole de l'abdomen plus que postérieurs. Pattes à spinulation réduite. Nervulation des ailes comme chez la femelle.

Egypte : Gebel Asfar, Sakkarah, Mazgouhna (Mai-Juillet).

Aire géographique : Egypte. Indiqué du Sénégal.

12. Sphex (Parasphex) lividocinctus Ach. Costa, 1858 (sub Enodia).

Priononyx Isselii Gribodo, 1880 ; *Enodia obliquestriata* Mocsary, 1883.

♀ : Longueur 15-20 mm. — Corps noir, l'abdomen avec un ou deux segments rouges, ou entièrement rouge, le pétiole de l'abdomen et les tarses rougeâtres.

Une pubescence feutrée extrêmement fine, argentée avec des reflets dorés recouvre la tête, le prothorax en entier, les bords latéraux du mesonotum, les mésopleures, le postscutellum, le segment médiaire, sauf sa face dorsale, les hanches des pattes antérieures et intermédiaires. La pubescence blanche, dressée, n'apparaît que sur le haut et l'arrière de la tête.

Mandibules courbes, avec deux dents contiguës et très rapprochées de la pointe. Clypeus légèrement bombé au milieu, échancré au bord antérieur. Yeux convergents vers le bas ; écartement des antennes à la base presqu'égal

à la distance qui les sépare du bord interne des yeux. Tempes normales.

Collier du pronotum non abrupt en avant, incliné; la partie antérieure déprimée est sillonée en travers. Mesonotum modérément ponctué dans sa partie centrale dénudée, cette ponctuation doublée par une autre très fine. Scutellum plan, deux fois plus large que long, ponctué, sans ligne médiane sauf une très légère indication en avant.

La partie dénudée de la face dorsale du segment médiaire est couverte de fines stries transversales, très serrées.

Petiole de l'abdomen presqu'aussi long que les fémurs postérieurs. Les tergites abdominaux couverts d'une ponctuation extrêmement fine leur donnant un aspect mat; vus sous un certain angle, d'arrière en avant, les tergites présentent des bandes claires à leur bord postérieur.

Pattes de force moyenne, à spinulation normale; peigne tarsal formé de 12 à 15 cils longs, raides, brunâtres. Quatre dents au bord interne des crochets des tarses.

Ailes antérieures faiblement jaunâtres. La deuxième cellule cubitale, sans en arriver à la forme carrée, est plus large, par rapport à sa hauteur, que chez les autres espèces de la subdivision.

♂ : Longueur 13-16 mm. — Le mâle de cette espèce, que je ne connais pas de visu, ressemblerait bien à la femelle, sauf en ce qu'il ne présente pas de bandes jaunâtres sur l'abdomen.

Egypte : Une ♀, Hawamdieh (20.VI.1925).

Aire géographique : Espagne, Sud de la France, Corse, Sicile, Calabre, Epire, Asie mineure, Algérie.

Cette espèce doit être assez rare, et passer inaperçue; à première vue elle ressemble assez bien à *viduatus* Christ. : les quatre dents aux crochets des tarses, et le scutellum plan, ponctué et sans ligne médiane appréciable caractérisent suffisamment cette espèce. *S. lividocinctus* Ach. Costa est variable comme coloration de l'abdomen : celui-ci est entièrement rouge dans notre spécimen, mais on en connaît qui sont noirs dans leur partie postérieure; par contre, rarement il est vrai, le rouge peut envahir le segment médiaire.

13. Sphex (Parasphex) nudatus Kohl, 1885.

D'après Kohl (loco cit., p. 187), serait voisin de *albisectus* Lepel.-Serv. par la forme du scutellum, la sculpture du segment médiaire et la présence de quatre dents aux crochets des tarses. *S. lividocinctus* Ach. Costa se distinguerait par le scutellum plan sans impression médiane. Longueur : ♀, 14-16 mm.; ♂, 12-13 mm.

Egypte : Je ne connais pas de capture, en Egypte, de cette espèce,

qui est citée par Kohl, de ce pays, d'après des exemplaires du Musée de Vienne.

Aire géographique : Sud-Ouest de la Russie, Caucase, Asie mineure (Brousse).

14. Sphex (Harpactopus) soror Dahlbom, 1845.

Sphex aegyptia Lepeletier, 1845, non Linné, 1758 ; *Harpactopus crudelis* Smith, 1856 ; *Sphex aegyptica* Taschenberg, 1869 ; ? *Sphex grandis* Radoszkowski, 1876.

♀ : Longueur 28-40 mm. — Entièrement d'un noir mat sur la tête et sur l'ensemble du thorax, ainsi que les pattes ; l'abdomen d'un noir assez brillant. Ailes jaunes, bordées de brunâtre.

Pubescence noirâtre, longue et touffue sur l'arrière de la tête et sur le segment médiaire, clairsemée sur le restant du thorax, nulle sur l'abdomen ; face couverte d'un duvet sous-jacent argenté, entremêlé de poils noirs.

Tête massive ; mandibules puissantes, munies à leur bord interne, de trois dents, dont les deux basales sont très fortes. Clypeus granuleux, fortement bombé au centre avec une impression médiane, déprimé en un mince rebord étalé en avant avec une incision semi-circulaire en son milieu, les bords latéraux aplatis. Yeux à bords internes droits, légèrement divergents vers le bas. Bases des antennes séparées par un espace plus petit que celui qui les sépare du bord interne des yeux ; deuxième article du funicule égalant en longueur une fois et demie le troisième, celui-ci égal au quatrième.

Collier du pronotum abrupt en avant, coriacé, non strié. Mesonotum très densément ponctué, coriacé, granuleux par places, avec indications de stries surtout sur les côtés ; mésopleures fortement chagrinées, plus ou moins striées vers l'arrière. Scutellum mat, nettement strié de chaque côté d'un sillon médian ; tubercule du postscutellum dentiforme, mat, le postscutellum silloné transversalement de chaque côté de la saillie dentiforme.

Face dorsale du segment médiaire fortement ridée, couverte d'une ponctuation confluente donnant au segment un aspect mat ; cette sculpture se retrouve sur les côtés, où les rides sont moins visibles, et sur la face postérieure. La pubescence touffue qui recouvre le segment rend difficile l'observation de cette sculpture ; celle-ci est mieux marquée chez les grands individus.

Pétiole extrêmement court, égalant moins de la moitié des fémurs postérieurs ; le premier tergite perpendiculaire sur le pétiole ; abdomen glabre, très finement pointillé, plus fortement ponctué sur le segment anal, qui porte aussi quelques poils.

Pattes longues, très robustes ; les épines normales, déjà fortes, sont doublées par d'autres plus longues et plus fortes, qui donnent aux tarses

un aspect hirsute. Peigne tarsal formé de 10 à 12 cils longs, raides, noirs. Deux dents au bord interne des crochets des tarses.

Ailes antérieures : insertions des deux nervures récurrentes normales ; deuxième cellule cubitale rétrécie sur la nervure cubitale par convergence régulière des deux nervures transverses.

♂ : Longueur 22-28 mm. — Coloration et pubescence comme chez la femelle, pubescence très touffue sur le segment médiaire. Mandibules plus courtes, avec une seule dent à leur bord interne, cette dent rapprochée de la pointe. Clypeus bombé, son bord antérieur largement découpé en arc, formant ainsi une arcade sous laquelle apparaît le labre, brillant, non ponctué. Yeux non divergents, à bords internes rectilignes et parallèles ; deuxième article des antennes guère plus long que le troisième. Abdomen à ponctuation microscopique et très dense sur les premiers tergites, plus forte et mieux marquée sur les trois derniers ; ceux-ci sont bordés de cils raides, et toute la face inférieure de l'abdomen présente de ces mêmes cils. Pattes moins fortement épineuses.

Egypte : Assez commun dans les zones cultivées et semi-désertiques (Avril-Octobre).

Aire géographique : Afrique orientale, Syrie, Indes.

15. Sphex (Harpactopus) subfuscatus Dahlbom, 1845.

Sphex nigrita Lucas, 1849 ; *Sphex desertorum* Eversmann, 1849 ; *Enodia chrysoptera* Ruthe [in Stein], 1857 ; *Gastrosphaeria anthracina* Ach. Costa, 1858.

♀ : Longueur 15-20 mm. — Ressemble beaucoup à *S. soror* Dahlb. Noire, à pubescence grise, moins fournie ; la pilosité argentée de la face a un reflet jaunâtre. Ailes jaunâtres, brunes à l'apex. La sculpture du thorax est moins accusée que chez *soror* Dahlb.

Les pattes *n'ont pas d'épines supplémentaires*, et la deuxième cellule cubitale *n'est pas rétrécie* sur la radiale.

♂ : Longueur 11-18 mm. — Comme la femelle, la pilosité noire au lieu d'être grisâtre. Le clypeus est moins bombé que chez le mâle de *soror* Dahlb.

Egypte : Port-Saïd, 2 ♀♀, en Juillet 1930. — Cité d'Egypte par Kohl (Musée de Vienne).

Aire géographique : Europe Centrale et Méridionale, Espagne, Sud de la France, Algérie (Lucas), Asie mineure. D'après Roth, rare en Afrique du Nord.

16. Sphex (Harpactopus) Eatoni Saunders, 1910.

♀ : Longueur 34 mm. — Noire. Tête, prothorax et mesonotum couverts d'une pubescence couchée, argentée ; pubescence du restant du corps

et des pattes noire, dressée, abdomen glabre. Ailes enfumées avec le bord apical des postérieures plus clair.

Mandibules fortes, bidentées à leur bord interne. Clypeus renflé, avec une impression médiane déterminant la formation de deux bosses devant le bord anétrieur, lequel est tranchant au milieu, un peu épaissi sur les côtés. Bords internes des yeux rectilignes, parallèles, non convergents ; bases des antennes séparées par un espace moindre que celui qui les sépare du bord interne des yeux ; deuxième article du funicule égalant une fois et demie le troisième.

Sculpture du pronotum et du mesonotum invisibles par la pubescence argentée qui recouvre ceux-ci. Scutellum partagé en deux protubérances par un sillon médian, le postscutellum avec un tubercule médian ; tous deux sont fortement striés en longueur. Mésopleures fortement et grossièrement striées.

Face dorsale du segment médiaire couverte de crêtes transversales très fines, plus ou moins anastomosées et doublées de gros points sur la zone médiane, très fines et très nettes sur les côtés ; les métapleures et les côtés du segment médiaire vers l'arrière sont également striés.

Pétiole de l'abdomen court, moindre que la moitié des fémurs postérieurs. Abdomen brillant à ponctuation extrêmement fine. Pattes grandes, à forte spinulation ; des poils très longs et flexibles aux pattes antérieures, le peigne tarsal formé de 8 cils raides entremêlés de quelques poils plus faibles.

Ailes antérieures : deuxième cellule cubitale rétrécie sur la nervure radiale ; insertion de la première nervure récurrente normale, la seconde presque interstitielle.

♂ : Longueur 27-29 mm. — Coloration et pubescence comme chez la femelle, mais collier du pronotum noir, sans pubescence argentée. Les ailes postérieures sont complètement colorées. Clypeus renflé avec une fossette au milieu du bord antérieur ; une entaille verticale en avant du clypeus, rend celui-ci bossu mais moins que chez la femelle. Bords internes des yeux légèrement convexes, les bases des antennes très rapprochées. Le deuxième article du funicule des antennes pas plus long que le troisième, celui-ci égalant le quatrième. Le sixième sternite est largement échancré en arc à son bord postérieur, avec les angles latéraux dilatés en saillie dentiforme : le septième sternite est logé dans l'échancrure du sixième.

Egypte : ♂, Hélouan, 29.IV.1930 ; Sinaï : ♀, Wadi Mitla, 8.V.1938.

Aire géographique : Décrit d'Algérie (Biskra) sur six specimens, trois femelles et trois mâles. Ne paraît pas avoir été retrouvé depuis, et doit être très rare.

17. Sphex (Harpactopus) Stschurowskyi Radoszkowski, 1887.

Le type de l'espèce n'est pas représenté en Egypte ; on connaît, de la Basse-Egypte, quelques captures de la variété *hyalinipennis* Kohl, 1895.

♀ : Longueur 33 mm. — Noire ; vertex, tempes, collier du pronotum et mesonotum couverts d'une pubescence conchée d'un blanc d'argent, avec quelques poils dressés sur la tête ; pubescence du reste du thorax noire, hérissée. Abdomen glabre. Ailes hyalines ; le bord apical des antérieures enfumé, nervures brunes, épaisses ; ailes postérieures entièrement hyalines.

Tête finement granuleuse, opaque. Mandibules fortes avec deux dents à leur bord interne. Clypeus bombé ; au bord antérieur une fossette médiane peu profonde produit, de part et d'autre, une gibbosité ; le bord antérieur lui-même est quelque peu échancré. Yeux légèrement convexes à leur bord interne. Les bases des antennes sont séparées par un espace plus petit que celui qui les sépare du bord interne des yeux ; les antennes sont insérées dans une excavation de la face. Le deuxième article du funicule est presqu'égal aux troisième et quatrième pris ensemble.

Un espace dénudé sur le disque du mésonotum montre qu'à cet endroit les téguments sont lisses, brillants, avec seulement quelques gros points isolés. Scutellum brillant à ponctuation très éparse ; postscutellum très ponctué, mat, avec un tubercule médian peu prononcé. Segment médiaire très rugueux, densément pubescent sur les côtés.

Pétiole de l'abdomen court, égalant à peine le tiers des fémurs postérieurs, épais, arqué. Abdomen brillant, finement ponctué. Pattes longues, à spinulation normale, le peigne tarsal formé de 12 à 15 soies fexibles.

Aux ailes antérieures, la deuxième cellule cubitale est rétrécie sur la nervure radiale ; insertions des nervures récurrentes interstitielles.

♂ : Longueur 18-22 mm. — Comme la femelle, noir, pas de pubescence argentée, néanmoins, un peu de cette pubescence se voit sur la face. Mandibules courtes et épaisses, la dent médiane ramenée vers la pointe qui paraît bifide. Clypeus plus bombé que chez la femelle, nettement impressioné à son bord antérieur, où il est échancré ; labre très visible sous le rebord du clypeus.

Mesonotum *coriacé, rugueux*, avec de gros points dispersés ; scutellum strié en long avec de gros points épars ; postscutellum également rugueux.

Egypte : Abou-Rouasch (Mochi, 1 ♀, 2 ♂♂, en Mai), Aboukir (Musée de Paris).

Aire géographique : Turkestan (Type) ; Algérie, Tunisie et Egypte (Variété).

Morice (1897) cite de cette espèce, un exemplaire mâle, ayant été pris à l'Abbassieh (Caire), lequel exemplaire fut ensuite communiqué à

Kohl ; celui-ci, sans faire allusion à la variété décrite en 1895, croyait y voir le mâle non décrit de l'espèce-type. Malheureusement, la description que Morice donne de son insecte est incomplète, et la figure (dessin de la face) qui l'accompagne est certainement différent de celui de la variété. Ceci restera donc en suspens.

18. Sphex (s.str.) pruinosus Germar, 1817.

♀ : Longueur 20-28 mm. — Noire ; mandibules, dessous du scape, écaillettes, pattes, les deux ou trois premiers segments de l'abdomen rouges ; rarement l'abdomen entièrement rouge (variété *scioensis* Gribodo), ainsi que le scutellum et le postscutellum. Tête et thorax couverts d'une pubescence fine, un peu laineuse, d'un blanc grisâtre ; face et dessous du thorax avec une pubescence argentée, couchée. Ailes hyalines, les supérieures enfumées à leur bord apical.

Mandibules falciformes, avec une forte dent au milieu de leur bord interne. Clypeus peu convexe, à peine incisé à son bord antérieur. Yeux légèrement convergents vers le bas ; leur bord interne droit. Tempes normales. Bases des antennes séparées par un espace moindre que celui qui les sépare du bord interne des yeux ; deuxième article du funicule égalant une fois et demie la longueur du troisième.

Collier du pronotum non abrupt en avant, arrondi en dessus. Mesonotum finement et densément ponctué, mat ; mésopleures plus brillantes. Scutellum finement ponctué, avec un sillon médiaire peu profond ; postscutellum aminci, échancré au milieu.

Aire dorsale granuleuse, avec de 5 à 9 crêtes transversales plus ou moins visibles sous la pubescence ; les côtés du segment ponctués. Pétiole de l'abdomen égalant la moitié des fémurs postérieurs, la surface de l'abdomen brillante, à ponctuation extrêmement fine.

Pattes à spinulation peu développée ; peigne tarsal formé de huit cils.

Aux ailes antérieures, insertions des nervures récurrentes normales.

♂ : Entièrement noir, très rarement des taches rouges sur l'abdomen. Pubescence plus longue et plus fournie que chez la femelle, abdomen pruineux. Mandibules petites, falciformes, avec une petite dent presque terminale. Les crêtes transversales du segment médiaire sont généralement peu visibles.

Egypte : Assez commun dans les régions cultivées en bordure du désert (Mai à Octobre).

Aire géographique : Algérie, Sicile, Méditerranée Orientale et Soudan.

19. Sphex (s.str.) umbrosus Christ, 1791.

Sphex argentata Fabricius, 1793 ; *Sphex argentifrons* Lepeletier, 1845 ; *Sphex albifrons* Lepeletier, 1845.

Le *Sphex umbrosus* Christ type n'a pas encore été rencontré en Egypte ; tous les exemplaires égyptiens que j'ai pu voir appartiennent, pour moi, à la variété *metallicus* Taschenberg décrite par l'auteur comme espèce et réunie à *umbrosus* Christ comme variété par Kohl en 1885.

♀ : Longueur 25-38 mm. — Noire, les mandibules rougeâtres à la base, les fémurs également rougeâtres (variation locale). Pubescence d'un gris foncé sur la tête et sur l'avant du thorax, brun de suie sur le dessous du thorax et sur le segment médiaire, où elle est bien fournie ; la face est couverte d'une pubescence couchée, argentée. Abdomen pruineux. Ailes incolores avec, à la base, une tache brune s'étendant au moins jusqu'à la moitié des cellules médiane et submédiane ; aux ailes antérieures l'apex est enfumé.

Mandibules puissantes, courtes, avec une forte dent au bord interne. Clypeus légèrement convexe, son bord antérieur entier. Bords internes des yeux parallèles ; bases des antennes séparées par un espace moindre que celui qui les sépare du bord interne des yeux. Tempes normales. Deuxième article du funicule des antennes presqu'aussi long que les troisième et quatrième pris ensemble. Vertex à ponctuation fine, pas très dense.

Collier du pronotum mince. Mesonotum finement et densément ponctué, mat. Mésopleures finement ponctuées, assez brillantes ; métapleures à ponctuation à peu près nulle, brillantes. Scutellum convexe, ponctué comme le mesonotum, avec une impression médiane ; postscutellum convexe, avec une forte impression médiane qui le partage en deux tubercules.

Aire dorsale du segment médiaire densément striée en travers, ses côtés mats, ponctués avec quelques stries.

Pétiole de l'abdomen très court, moins long que la moitié du fémur postérieur.

Pattes robustes. Peigne tarsal formé de 9 à 10 cils raides, de couleur brunâtre.

♂ : Longueur 21-29 mm. — Coloration et ailes comme chez la femelle. Mandibules courtes, nettement courbées sous un angle de 60 degrés environ, avec une forte dent située dans l'angle même. Clypeus bombé, son bord antérieur largement échancré, dépassant le bord inférieur des yeux ; le labre est visible dans l'échancrure. Yeux légèrement convergents vers le bas. Bases des antennes contigues. Abdomen très pruineux, septième sternite avec une touffe de pubescence.

D'après la description donnée ci-dessus, établie sur des specimens d'Egypte, je considère que nous avons-là, non pas le vrai *umbrosus*, mais la variété *metallica* de Taschenberg : chez le type de l'espèce, les taches basilaires des ailes, sont moins étendues, elles ne couvrent que le tiers ou le quart des cellules médianes et sous-médianes ; la pilosité de la tête et du thorax est plus claire, d'un gris-blanchâtre, et la pubescence couchée, blanche à reflets argentés de la tête se continue sur le pronotum.

Tous ces caractères différentiels n'ont qu'une valeur relative : *umbrosus* et *metallicus* sont plutôt deux races géographiques que de véritables variations formelles ; à preuve, leurs aires de dispersion bien distinctes comme orientation : aux points de contact, il doit exister des formes intermédiaires douteuses.

Egypte : Commun dans les régions cultivées, de Janvier en Mai, puis de Juillet en Octobre.

Aire géographique : Grèce, Nord de l'Arabie, Perse, Indes, Chine, Japon, Iles de la Sonde, Amboire, Célebès (Type) ; Afrique, depuis l'Egypte jusqu'au Cap, Sud de l'Arabie, Ceylan (?) (Variété).

20. Sphex (s.str.) maxillosus Fabricius, 1793.

S. flavipennis (Latreille) 1805 et Auctt. plur., nec Fabricius, 1793 ; *S. rufocincta* Brullé, 1832 ; *S. cinereo-rufocincta* Dahlbom, 1845.

♀ : Longueur 20-27 mm. — Noire, abdomen généralement en grande partie rouge, cette même couleur envahit plus ou moins les pattes antérieures et intermédiaires. Ailes d'un jaune grisâtre, les antérieures avec une bordure apicale enfumée faiblement marquée, les postérieures peu colorées.

Pubescence générale de la tête et du thorax grisâtre, hérissée, peu touffue, sauf sur le segment médiaire. La face couverte d'une pubescence couchée, argentée, entremêlée de poils plus longs de la même couleur ; des traces de cette même pubescence couchée sur les côtés du mesonotum et du scutellum. Abdomen glabre.

Mandibules épaisses, avec une dent à leur bord interne, cette dent forte, s'étendant jusqu'à la pointe de la mandibule. Clypeus bombé au centre, le bord antérieur déprimé, rebordé, arrondi. Bords internes des yeux légèrement concaves sur un petit espace vers le haut, convergents vers le bas ; bases des antennes séparées par un espace moindre que celui qui les sépare du bord interne des yeux. Deuxième article du funicule des antennes égalant une fois et demie le troisième article. Tempes assez développées.

Face antérieure du collier du pronotum non abrupte, descendant en biais vers l'avant ; le haut du collier non épaissi, ponctué, peu brillant. Mesonotum finement, mais nettement ponctué, assez brillant, de même que le scutellum ; celui-ci épaissi, et partagé en deux par une très fine ligne médiane. Postscutellum incisé au milieu, mat. Mésopleures finement ponctuées. Segment médiaire très finement et densément striolé sur toute sa surface.

Pétiole de l'abdomen très court. Abdomen très finement pointillé, avec des points plus gros et serrés sur les trois derniers tergites.

Pattes robustes, à spinulation courte, assez dense ; peigne tarsal formé de sept à huit cils longs, flexibles, avec autant d'épines courtes, intercalaires. Plaque anale ventrale non comprimée.

Aux ailes antérieures, l'insertion des nervures récurrentes est normale; la troisième cellule cubitale est très rétrécie sur la nervure radiale, l'espace qui sépare les deux nervures discoidales sur la nervure radiale est presque nul.

♂ : Longueur 13-20 mm. — Coloration comme chez la femelle; les derniers segments de l'abdomen et les pattes noires. Pubescence plus fournie. Clypeus faiblement mais visiblement échancré à son bord antérieur. Yeux plus convergents vers le bas. Deuxième article du funicule des antennes plus long que le troisième mais plus court que ce même deuxième article chez la femelle. Thorax enitèrement mat, à ponctuation très serrée et confluente; abdomen pruineux. Dernier arceau ventral couvert d'une pubescence courte, dressée.

Egypte : Assez commun dans la zone semi-désertique (Mai-Juin).

Aire géographique : Tout le Bassin circumméditerranéen, Sud de l'Europe (remonte jusqu'en Allemagne), Asie Mineure, Afrique du Nord.

21. Sphex (s.str.) flavipennis Fabricius, 1793 (non sensu Latreille, 1805, et Auctt. plur.).

S. bicolor Dahlbom, 1845.

Il est difficile de séparer nettement *flavipennis* Fabr. de *maxillosus* Fabr. : on peut vraiment se demander s'il n'y a pas là deux races (géographiques ?) s'excluant plus ou moins l'une l'autre, selon les observations de Roth en Algérie (voir Roth, 1925, pp. 391 et seq.).

La taille est plus forte (♂, 22-28 mm.; ♀, 30-33 mm.); la pubescence couchée de la face est dorée, entremêlée de poils plus longs et dressés, de la même couleur; la pruinosité dorée des côtés du mesonotum est plus développée et donne même au mesonotum un aspect mat. La coloration jaune des ailes est plus intense, ainsi que la bordure brune.

La seule femelle d'Egypte, dans ma collection, que je considère comme appartenant réellement à *flavipennis* Fabr. est copie conforme à deux exemplaires du Midi de la France; deux mâles de Sakkarah sont également *flavipennis*. A côté de cela il y a quelques exemplaires vraiment douteux.

Egypte : Kerdacé, Sakkarah. Doit être plutôt rare.

Aire géographique : Comme *maxillosus*, mais plus localisé.

22. Sphex (Isodontia) pelopoeiformis Dahlbom, 1845.

Décrite de Khartoum, cette espèce est répandue dans toute l'Afrique orientale et équatoriale; sa présence en Egypte ne sera jamais qu'accidentelle.

La localité d'origine, Khartoum, me paraît déjà douteuse.

COMPARAISON ENTRE LA FAUNE EGYPTIENNE ET CELLE DES REGIONS VOISINES

Si nous éliminons les espèces dont la présence en Egypte est douteuse, il nous reste dix-sept espèces habitant la région. En Algérie-Tunisie, il y en a vingt, d'après P. Roth ; en Asie Mineure, ou plus exactement en Syrie, il y en a dix-huit, chiffre approximatif faute de renseignements plus précis. Le nombre des espèces est sensiblement identique d'une région à l'autre ; mais quelle est l'origine lointaine de ces espèces ?

Il y a sept espèces communes aux trois régions : *viduatus* Christ, *albisectus* Lepeletier et Serville, *lividocinctus* Ach. Costa, *subfuscatus* Dahlb., *pruinosus* Germar, *maxillosus* Fabricius, *flavipennis* Fabricius. Une seule, *viduatus* Christ, a une aire de dispersion très étendue, les autres sont des paléarctiques ubiquistes de la région méditerranéenne, sauf *pruinosus* Germar qui fait défaut en Europe même, mais descend jusqu'au Soudan.

Quatre espèces sont spéciales à l'Egypte, ou plutôt ne se trouvent pas dans les deux autres régions : *regalis* Smith, *hirtus* Kohl, *funereus* Grib. et *trichargyrius* Spinola. Les trois premières sont des *Chlorion*, et précisément les seuls qui existent dans la région ; les *Chlorion* sont très répandus dans les tropiques.

Quatre espèces manquent en Syrie : *niveatus* Dufour, *nigropectinatus* Dufour, *Stschurowski* Radoszk. var. *hyalinipennis* Kohl, *Eatoni* Saunders. Les deux premières sont plutôt soudanaises, les deux autres sont encore trop peu connues pour connaître vraiment leurs origines.

Deux espèces manquent en Algérie et se retrouvent en Syrie : *soror* Dahlbom, *umbrosus* Christ, qui sont largement répandues depuis l'Afrique Orientale jusqu'aux Indes et au Japon ; ces espèces atteignent probablement, en Egypte, la limite extrême de leur dispersion vers l'Ouest Paléarctique.

Au fond, on peut dire ceci : sur dix-sept espèces se trouvant en Egypte, onze se rattachent à des régions non-paléarctiques, l'Afrique orientale et le Sud Asiatique : l'Egypte a dû être peuplée, en *Sphex*, par la vallée du Nil et par la voie Irak-Arabie. Les espèces méditerranéennes que possède l'Egypte en commun avec le Nord de l'Afrique lui sont très probablement parvenues par la Syrie ; par contre, à peine deux espèces soudanaises, *niveatus* Dufour et *nigropectinatus* Dufour, ont pu arriver jusqu'en Algérie.

Peut-on considérer le millier de kilomètres de déserts qui nous sépare de l'Afrique du Nord comme une barrière efficace ?

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Additions to the Coccoidea of Iraq, with descriptions of two new species

[Hemiptera-Homoptera]

by Prof. F. S. Bodenheimer,
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During 1943 a number of additional Coccoidea were collected in various parts of Iraq. The numbers refer to those of the writers Survey of the Coccoidea of Iraq (1).

1. Quadraspidiotus populi Bdhmr.

This species was collected again at Baghdad from *Populus euphratica*. In addition, it has proved to be abundant in the North-West Iran. It is, therefore, an Irano-Turanian element, which reached Baghdad from the North along the river.

3. Aonidiella orientalis Newst.

This species is abundant and very injurious at Basra and in the Shatt al Arab, on *Citrus* (orange, turunj, lime, pompelmus), on *Cordia myxa*, and *Nerium oleander*. At Baghdad, it was again collected on *Dalbergia sissoo*, on which common allee tree it is common in many parts of Baghdad. The same differences which were enumerated before (1943, p. 3) are constant. All specimens from Iran ressemble those from the Basra area.

6. Diaspidiotus lataniae Sign.

The species could not be recollected at Ramadi in spite of special scouting on two occasions.

7. Melanaspis inopinata Leon.

On *Fraxinus* near Penjween.

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(1) F. S. Bodenheimer: Three new Mealybugs from Palestine and Iran. — Appendix: A first survey of the Coccoidea of Iraq (Min. Econ., Dir. Gen. Agric., Iraq, Bull. 28. 1943, 32 pp.).

12. Mytilococcus intermittens Hall.

Again on leaves of *Eragrostis cynosuroides* at Basra.

19. Coccomytilus halli Green.

On branches and twigs of *Amygdalus persica* at Jadriye.

23. Parlatoria blanchardi Targ.

Common at Basra on date palms.

25. Parlatoria morrisoni nov. spec.

The specimens included hitherto into *Parlatoria ? pergandei* all belong to this new species, which in the mean while has also been found in Iran.

Scale of adult female covered with white secretion. Whitish, short elliptic or narrowing on hind end, with exuviae excentric to marginal, yellow-brown. 1.5×1.0 mm.

Body of adult female short oval with pygidium broad triangular, protruding. Broadest at 2/3 of body length. Antennae tubercular with one stout, strongly curved seta. Duct tubercles in two groups on prosoma (4-6, 3-5). Mesospiracles with 3, metaspiracles with no spiracerores.

Pygidial margin with median lobes broad, twice notched. The 3 lateral lobes narrow and slender, distinctly notched. With macroduct in interval between median lobes. Three plates only between third and fourth lobes, the middle one very broad. The specimen figured in the « Coccoidea of Iraq » (1943, fig. 8), where 4 plates are present on one side, was quite exceptional. Very characteristic is one pair of macroduct openings between the anterior genacerores (dorsally), another pair each side just covering them from above. Genacerores in four groups : $\frac{6\text{-}8}{4\text{-}5}$

We have not found *Parlatoria oleae* in the Baghdad area, whilst it is very common in the North. It is possible that the old records for *P. oleae* have to be referred to this species. The complete distribution and host list, as far as known to us, is :

Iraq : In the Baghdad area on *Olea europaea, Morus alba, Nerium Oleander,* and *Jasminum sambuc.* At Ramadi on *Nerium oleander.* In the Shatt al Arab on *Cordia myxa, Rosa* (cult.), *Melia azederach, Morus alba* and *Nerium oleander.*

Iran : Khousistan, on *Zizyphus,* and Bender Guez on *Citrus.*

Parlatoria morrisoni nov. spec. is probably a cultural immigrant of Oriental origin. It is dedicated to Dr. Morrison, the able reviser of the important genus *Parlatoria.*

27. Suturaspis pistaciae Ldgr.

At Amadiya in *Pistacia khinjuk*.

28. Salicicola kermanensis Ldgr.

Common on stem and branches of *Salix acmophylla* and of *Populus alba* at Sheikh Ibrahim, Amadiya, Aqra and Baghdad.

30. Coccus hesperidum L.

On *Citrus aurantium* at Baquba and Diwaniye.

38. Pseudococcus citri Risso.

Quite common, ovipositing on the leaves of *Morus alba* at Baghdad in August 1943.

42. Rhizoecus cynodontis Bdhmr.

On leaf sheats of *Eragrostis cynosuroides* at Basra.

48. Phenacoccus radii Bdhmr.

On roots of *Alhagi maurorum* at Baghdad. Our attention was attracted by the visits of a medium sized black ant. The living specimens are pink, the eggs yellow.

56. Asterolecanium phoenicis Rao.

Widely spread, but not common on *Phoenix dactylifera* in the Shatt al Arab.

58. Phoenicococcus marlatti Comst.

Common in Shatt al Arab.

61. Aulacaspis rosae Sdbg.

On stem of cultivated roses in gardens at Jadriye and Baghdad.

62. Mytilococcus conchyformis Gmel.

On branches and twigs of *Ficus carica* at Kut es Sayyid and at Baquba.

63. Eulecanium bituberculatum Targ.

On twigs of *Crataegus* spec. (cult.) at Zafraaniye, the eggs hatching in February. The species is almost certainly introduced into Central Iraq with the host from the North. It is also reported from plums near Baghdad.

64. Eulecanium tiliae L.

On *Rhus* spec. at Ser Amadiya.

65. Ceroplastes rusci L.

This species was found in the collection of the Plant Protection Service at Baghdad from Kirkuk on twigs of *Ficus carica* (9.X.1937). It is also reported from some parts of the Baquba district on the same host..

66. Aclerda wiltshirei nov. spec.

Body of adult female broad pyriform with distinct spiracular clefts, being broadest usually between the two spiracular constrictions. Segmentation preserved only on venter in last abdominal segments. Margin of caudad third incised by furrows, which run far into the submarginal area. Caudal lobes well rounded with shallow anal cleft. Eyes, legs and antennae apparently wanting entirely. Rostrum always caudad of mesospiracles and rather small, with rostral loop not visible. Spiracles large, with 30 to 40 obscured pores close to aperture.

Anal tube restricted in middle, with 6 short setae (33 μ). No group of long hairs or setae protruding caudad. Anal plate oblongate obtuse triangular, with 1 or 2 notches on each side, distinctly surpassing the body margin.

Derm around margin with pores of short and small tubular ducts. A few minute pores scattered all over derm. No setae, no hairs, no spines, no other glands have been observed, not even on the margin, where they could not possibly have evaded observation.

On stem of *Phragmites communis* at Basra. The species is dedicated to Mr. E. P. Wiltshire, who has so much contributed to the exploration of the Lepidoptera of Iraq and of other countries of the Middle East.

Note on the Coccoidea of Iran, with descriptions of new species

[Hemiptera-Homoptera]

by Prof. F. S. Bodenheimer,
Hebrew University, Jerusalem (Palestine)

The Coccoidea of Iran are very little known. One may almost say, that together with Arabia, it is the only major remaining lacune. The writer was therefore extremely pleased to be enabled by the hospitality of the Iranian Government to collect a few species around Teheran and on the main motor road from Teheran to the Iraqi border at Khaniqin in July 1943. He was also given important materials by Prof. J. Afchar at Karaj, by Prof. N. S. Sherbinovsky and by Mr. Mohammed Kaussari. To all of them, and especially to His Excellency Fathy Bey of the Ministry of Agriculture at Teheran, the author's kindest gratitude is offered.

I. EARLIER NOTES ON THE COCCOIDEA OF IRAN

The first recent note on scale insects from Iran seems to be the report of E. H. Ruebsaamen (1902) on insect galls collected by Bornmueller in the Middle East. He describes *Asterolecanium bornmuelleri* nov. spec. causing galls on the twigs of *Quercus persica*. Lindinger published a few scattered notes. In 1905 he described *Leucaspis kermanensis* nov. spec. from poplars, and in 1911 *Parlatoria ephedrae* nov. spec.. The same author recorded *Aonidiella orientalis* Newst. from *Ficus*. E. E. Green mentioned *Naiacoccus serpentinus* nov. spec. *minor* nov. var. in 1919 from *Tamarix*. Lindinger (1931) adds *Diaspis syriaca* from *Pistacia*. A. D. Archangelskaya (1937), in her Monograph on the « Coccidae of Middle Asia », quotes from recent Russian sources, to which we had no access, the following twelve species from Iran :

Orthezia urticae Linné. *Eulecanium bituberculatum* Targ., *Eulecanium tiliae* L. (*coryli* auct.), *Sphaerolecanium prunastri* Fonsc., *Pulvinaria artemisiae* Licht., *Pulvinaria betulae* L., *Pulvinaria pistaciae* Bdhmr., *Parlatoria blanchardi* Targ., *Parlatoria oleae* Colv., *Mytilococcus beckii* Newm., *Mytilococcus pistaciae* Arch., and *Chionaspis asiatica* Arch.

J. Afchar, professor of entomology at the College of Agriculture at Karaj, recently published the following list of twenty-one species :

Icerya purchasi Mask., *Phoenicococcus marlatti* Ckl., *Eulecanium coryli* L. (*corni* auct.), *Eulecanium bituberculatum* Targ., *Pulvinaria betulae* L., *Pulvinaria floccifera* Westw., *Ceroplastes* spec., *Pseudococcus citri* Risso, *Aspidiotus hederae* Vall., *Aonidiella aurantii* Mask., *Chrysomphalus dictyospermi* Morg., *Aulacaspis rosae* Sdbg., *Mytilococcus beckii* Newm., *Mytilococcus gloveri* Pack., *Mytilococcus ulmi* L., *Mytilococcus pistaciae* Arch., *Chionaspis asiatica* Arch., *Chionaspis salicis* L., *Parlatoria blanchardi* Targ., *Parlatoria oleae* Colv., and *Parlatoria zizyphi* Luc.

Only thirty-three species of Coccoidea are so far known from Iran.

II. LIST OF THE COCCOIDEA OF IRAN, KNOWN SO FAR

Orthezиidae

1. Orthezia urticae Linné.

Iran : *Fide* Archangelskaya (1937), p. 25.

Margarodidae

2. Margarodes spec.

Prof. Afchar informed the writer, that damage in wheat fields has been observed which was caused by an undetermined and unfortunately not preserved species of *Margarodes*. It may be either *Margarodes tritici* Bdhmr., known from South-East Anatolia, or *Margarodes polonicus* L., mentioned by Picard and Balachowsky from North Syria. *Margarodes hameli* Brandt is known from the Ararat. A series of species has recently been described from Russian Central Asia. We would expect quite a number of species of ground-pearls in the steppes of Iran.

3. Icerya purchasi Mask.

Afchar (p. 35) mentions this species on *Acacia, Convolvulus, Trifolium, Cannabis sativa, Eucalyptus, Berberis, Cinnamomum camphora, Lappa, Polygonum avicularia, Setaria viridis, Plantago media, Magnolia grandiflora* from Resht and Mazenderan. We have received specimens from the later locality from *Citrus aurantii* leaves (larva II), collected by Prof. Afchar. There seem to be no records, so far, beyond the South Caspian district.

Phoenicococcidae

4. Phoenicococcus marlatti Ckll.

Afchar (p. 29) mentions it from date palm. We have obtained it from Mohammera with other scale insects. It seems to be common in Khousistan, where conditions resemble those of South Iraq.

Asterolecaniidae

5. Asterolecanium bornmuelleri Ruebsaamen.

Described from Farsistan (road from Shiraz to Qaserun at 2200 m.alt.) on branches and twigs of *Quercus persica*, causing pits (Ruebsaamen [1902], p. 316). The original description is very poor. Russell (1941, p. 229), the recent monographer of the genus, considers it however as probably being a good species. As the original description has appeared in a not easily accessible paper, a translation of it is given herewith :

« The gall is very similar to that caused by *Asterolecanium quercicola* Bché. The scales sit in a pit of the bark, which is surrounded by a wall. The insects seem slightly smaller than *A. quercicola* near Berlin. The exuviae stick to the margin in a resinous mass. They also have the same radial fringe (Strahlenkranz) as *A. quercicola*. This fringe is composed by pairs of setiform wax-filaments which diverge. The filaments are secreted by marginal paired glands. In *A. quercicola* this ring of paired marginal glands is surrounded by another one of simple glands. The Iranian species has not this ring of simple glands. Also, the dorsal hairs with apical thickenings are less dense and seem occasionally to be wanting ».

New material will be needed in order to enable a description which is more up to the high standard, set by Russell for the genus.

6. Asterolecanium minus Lindinger.

This is probably the species mentioned by Lindinger (Schildlaeuse Europa's, 1912, p. 280) from Kurdistan as *A. variolosum* Ratz. We met it on the Zagros range on *Quercus infectoria*. It is the common species of the genus in Anatolia and North Iraq on oaks.

7. Asterolecanium phoenicis Ramachandra.

This species was hitherto known only from the date belt of Iraq. It was present on the sample of date scales from Mohammera. It seems to be spread all over Khousistan.

Coccidae

8. Coccus hesperidum L.

It is peculiar that this common Soft Scale has not yet been mentioned before. We have collected it at Teheran on leaves of ornamental *Citrus aurantii* and of *Hedera helix*. Prof. Sherbinovsky gave us a sample from Bender Guez on orange leaves, and Prof. Afchar one from *Citrus* at Mazenderan, another from oleander leaves. *C. hesperidum* L. is widely spread over Iran and is one of the conspicuous species on ornamental plants in gardens

9. Eulecanium bituberculatum Targ.

This species is mentioned by Archangelskaya (1937, p. 45) and by Afchar (p. 44) from pear and plum. We have recently found the same species in Central Iraq on *Crataegus* and plum.

10. Eulecanium coryli L.

This species is the common *Lecanium corni* auct. Sulc has recently shown, that Linné's type of *coryli* was this species. The *Eulecanium coryli* auct. has changed into *E. tiliae* L. The species is mentioned by Afchar (p. 44) from pear and apple trees in Iran.

11. Eulecanium persicae F.

From unknown host at Karaj (coll. J. Afchar).

12. Eulecanium tiliae L.

Archangelskaya (1937, p. 49) mentions this species as *Lecanium coryli* L. Resht and Shiraz on twigs of unknown plants (coll. J. Afchar).

13. Pulvinaria betulae L. (=vitis L.).

Mentioned from Iran by Archangelskaya (1937, p. 36) and by Afchar (p. 31) from Azerbeijan and Teheran on *Vitis*. We have it from Resht and Shiraz on apricot and an unknown tree (coll. Afchar).

14. Pulvinaria artemisiae Licht.

Fide Archangelskaya (1937, p. 134). We have a rather similar species from the rootstem of *Euphorbia* spec. at Abeh. The material is however insufficient for an exact identification.

15. Pulvinaria floccifera Westw.

Gilan and Resht on *Citrus* (Afchar, p. 33). We have material from leaves of *Citrus* and from an unknown plant at Karaj.

16. Pulvinaria pistaciae Bdhmr.

Mentioned by Archangelskaya (1937, p. 39). It is a pest of *Pistacia vera*. Damgan and Birjend (coll. Afchar), from Qazwin and from the Zagros mountain. In the later locality on *Pistacia khinjuk*.

17. Sphaerolecanium prunastri Fonsc.

Archangelskaya (1937, p. 44). On *Rhamnus dahurica* (introduced) at Karaj.

18. Filippia ephedrae Newst.

On twigs of *Ephedra alte* in the collection of Prof. Afchar at Karaj.

19. Filippia gossypii nov. spec.

Body broad oval, broadest at last third, 4.0×2.2 mm. Entirely covered by a white cottony ovisac, which is considerably longer than the insect, about 10×4 mm.

Antennae slender, tapering, 8-jointed, with long setae on the end of each joint. 1+2 smaller hairs on joint V, 1+1 smaller on VII, and 5 long setae of inequal size on VIII. Length of joints : I, 28; II, 61; III, 56; IV, 95; V, 11; VI, 28; VII, 17; and VIII, 50 μ.

Rostral loop short, not reaching to 2nd coxae. Spiracular depressions slight with 3 spines, the median one 3 to 5 times longer than the lateral (28 to 50 : 11 μ) ones, with a double submarginal series of about 8 quinquelocular paraspiracular pores, followed by a double row of 7 or 8 long setae. No marginal spines. Marginal setae rising from a thick sclerotic base tubercle, not very dense, at intervals from 50 to 90 μ.

Legs well developed, subequal, with a distinct tibio-tarsal articulation and a heavily sclerotic tarsal articular process. Tibia about twice as long as tarsus. Claw short, dilated at base, stout, and strongly curved. Ungual digitules twice as long as claw and padded, tarsal digitules about twice as long and distinctly knobbed at end. Fore-leg : coxa, 116; trochanter, 33; femur, 150; tibia, 139; tarsus, 83; and claw, 22 μ.

Anal cleft of medium size. Anal plates blunt triangular with outer margin convex and cephalic margin concave. Bearing 2 apical, 2 discal and 2 long hypopygial setae. Anal setae 8, slightly surpassing middle of anal plates, 128 μ long. With rows of translucent pores caudad and big multilocular pores cephalad.

Ventral derm with one pair of long setae on each of the last three abdominal segments, which grow smaller caudad. Some smaller setae all over the venter. 2+(1)+2 long setae just caudad between antennae. Dorsal derm with tubular ducts.

Collected at Chabahar (Irano-Indian border) on branches of cotton by Mr. C. Kaussari. Apparently not injurious. The white ovisacs are very obvious.

20. Eriopeltis festucae Fonsc.

On *Eragrostis* spec. in grass steppe between Kermanshah and the Zagros mountains.

21. Ceròplastes sinensis Del Guerc.

Some not very well preserved specimens from *Citrus* in Mazenderan are almost certainly this species. Here also belongs the species of *Ceroplastes* recorded by Afchar from the same locality and host (p. 34).

22. Bodenheimera rachelis Bdhmr.

This aberrant Coccid was collected at Qasr i Sherin by Prof. Sherbinowsky on *Vitex pseudonegundo*. We found it in the same area, slightly closer to the western slope of the Zagros mountains.

Pseudococcidae

23. Pseudococcus citri Risso.

Mentioned by Afchar (p. 34) from Azerbeijan and Taebris on *Vitis*. We have it from pomegranate fruit at Tarse and Khousistan on grapes (coll. J. Afshar). It seems to be a locally important pest of grapes.

24. Pseudococcus fathyi nov. spec.

Adult female elliptic with subparallel sides and with front broadly projecting between antennae. Thickly covered by mealy secretions with regular short filaments around the margin 2.0-2.5 × 1.3-1.6 mm.

Antennae long and slender, 8-jointed. Length of joints : I, 61; II, 67; III, 72; IV, 28; V, 50; 6, 44; VII, 44; and VIII, 112 μ. Setae on joints : I, 3; II, 5; III, 4; IV, 4; V, 6; VI, 4; VII, 4; and VIII, 12.

Ocelli marginal, small, highly convex. Rostral loop reaching to 2nd coxae. Spiracles short dumb bell shaped without adnected glands. Legs well developed, with many long hairs. Claws short, dilated at base, strongly curved. Ungual digitules padded, tarsal digitules long and slender, minutely knobbed. Hind-tarsus densily covered by pores on inner surface (over 100). none on external surface. On the inner surface of the hind-femur also about 70 similar pores. Length of fore-coxa, 139; of trochanter, 72; of fore-femur, 234; of fore-tibia, 216; of fore-tarsus, 116; and of claw, 28 μ.

Posterior and anterior dorsal ostioles present, circulus not observed.

Anal ring with double pore band and 6 strong anal setae. Caudal lobes flatly rounded, sclerotic. Caudal seta slightly shorter than anal setae (0.0125 mm.). Four long hairs on caudal lobe.

Ventral derm with transversal rows of long hairs, with short tubular ducts and, especially cephalad of anus, with large ring shaped pores. A group of long hairs between antennae and rostrum. Dorsal derm with short hairs and short tubular ducts.

18 pairs of distinct cerarii, arranged as follows : 1 on caudal lobe, 17 para-ocular, and 18 frontal. Each cerarius provided with two spines. Number of pores on cerarii : one, 50; two, 25; three, 15; four, 15; five, 15; six, 10; seven, 15; eight, 15; nine, 10; ten, 5; eleven, 10; twelve, 10; thirteen, 15; fourteen, 10; fifteen, 12; sixteen, 15; seventeen, 10; and eighteen, 10. Number of hairs on cerarii : three, 2; five, 2; nine, 2; eleven, 2; twelve, 5; thirteen, 2; fourteen, 2; fifteen, 2; sixteen, 2; seventeen, 2; and eighteen, 4. Cerarian area not sclerotic.

The species is easily recognisable by the excessive large number of pores on hind femur and hind tarsus. The species is named after His Excellency Mr. F a t h y, the energetic Secretary of State for Agriculture in Iran, who showed a deep interest in our work.

Collected at Haraj in old galls of *Prociphilus* on *Fraxinus*.

25. Pseudococcus spec.

Body elongate elliptic. Antennae 8-jointed, their length being as follows : I, 56; II, 67; III, 78; IV, 39; V, 50; VI, 39; VII, 28; and VIII, 67 μ.

Rostrum reaching to behind 3rd coxae. Eighteen pairs of cerarii on a very definite sclerotic basis with two spines each, surrounded by a few pores. The spines grow shorter cephalad.

Legs long and robust. Hind-legs : coxa, 139; trochanter, 78; femur, 261; tibia, 272; tarsus, 111; and claw, 28 μ. Both pairs of dorsal ostioles distinct. Circulus large and broad. The six anal setae long, 117 μ, surpassing by far the short rounded caudal lobes. No caudal setae preserved in our specimens.

Dorsal derm with short hairs and small tubular ducts. Ventral derm with large ring shaped pores in the caudal area, else with transverse bands of long hairs and with many three-locular pores.

The species is distinguished from all other Middle-East species of the genus *Pseudococcus* by the very distinct sclerotic base of all cerarii. We abstain, however, from naming it, as the specimens are rather incomplete.

Collected at Karaj on unknown plant, by J. A f c h a r.

26. Pseudococcus spec.

During our stay at Teheran another species was rather common on *Thuja*. It was heavily covered by mealy secretions. Unfortunately none of our slides is sufficient for any description. It is desirable to obtain more material of this apparently common species.

27. Phenacoccus aceris Sign.

A few specimens of this species were collected at Teheran in the garden of the Iraqi legation on leaves of *Platanus orientalis*.

28. Phenacoccus euphorbiaefolius Bdhmr.

This very characteristic species from leaves of *Euphorbia* spec. was recently described by the writer from the North-East parts of Iraqi Kurdistan in October. The same species was locally abundant on the same host in July on the eastern slopes of the Zagros mountains.

29. Phenacoccus sherbinowskyi Bdhmr.

This species was recently described by Bodenheimer (1943, p. 32) from material kindly sent by Prof. Sherbinowsky, who makes the following notes : « I happened to find that mealy-bug on 8th July last on the slopes of the town of Khash (South Balujistan) upon *Otostegia kotschyi* Boiss. (Labiatae) ».

30. Naiacoccus serpentinus minor Green.

The species was described by E. E. Green (1919, p. 118) from North-West India and from the desert North of Nasratabad (Seistan) on *Tamarix*. It is probably widely spread on that host in Iran, as it occurs from Russian Central Asia to Egypt. This is one of the species which cause the production of the Sinai manna. It is equally probable that one or two species of *Trabutina* (*T. palestina* Bdhmr. and *T. mannipara* Ehrbg.) also occur in Iran. Mr. E. P. Wiltshire informed us, that the manna of Ispahan is probably identical with the Sinai manna. It is collected in mountains at some distance from that town from *Tamarix*. It would be highly desirable to obtain original material from this region.

31. Nidularia balachowskyi Bdhmr.

On a branch of *Quercus* spec. in the Zagros mountains near Kermanshah, a few specimens. The species is known so far from South-East Anatolia and from North Palestine.

32. Fonscolombia fraxini Kalt.

On bark of *Fraxinus excelsior* in a park at Shamran (near Teheran). We have collected it, but no specimens were available for microscopic examination. We are practically certain, that this is the collected species.

33. Gossyparia spuria Mdr.

On trunk of young trees of *Ulmus campestre*, at Karaj.

34. Eriococcus spec.

On June 1942, Prof. Sherbinowsky collected first stage larvae of a species of *Eriococcus* near Bissotoun on an unknown grass. The following features may be mentioned : Body elongate elliptic. Marginal spines short and stout conical, arranged in groups of two on the abdominal segments, a single one only on the segment I, two on meta-, three on mesothorax and two groups of four each to the frontal mediane. No dorsal spines. Antennae 6-jointed, not tapering. Caudal lobes strongly sclerotic with very long caudal seta 167 μ, and two much smaller auxiliary setae. Anal setae 28 μ. Spiracles short and stout, with one large pore each cephalad of mouth. Antennae : I, 11 ; II, 70 ; III, 11 ; IV, 10 ; V, 7 ; and VI, 11 μ. Hind-legs : coxa, 33 (+ wedge, 22) ; trochanter, 28 ; femur, 50 ; tibia, 56 ; tarsus, 25 ; and claw, 14 μ.

Diaspididae

35. Aspidiotus hederae Vall.

Mentioned by Afchar (p. 27). We have collected it from leaves of *Washingtonia* and another ornamental palm at Karaj and at Teheran. We have received material from Prof. Afchar : from Resht on *Asparagus plumosus*, and from palm leaf ; from *Nerium oleander*, and from *Asparagus plumosus*, at Karaj.

36. Quadraspidiotus ostraeformis Curt.

From bark of apple tree at Sahne, on *Salix* at Sahne, Shah Abad and Teheran.

37. Quadraspidiotus populi Bdhmr.

This big species was recently described from Baghdad. It is common in North-West Iran. We have collected it on branches, twigs and leaves of *Salix* spec. at Pas Qaleh, Sahne and Bissotoun.

38. Aonidiella aurantii Mask.

Recorded by Afchar (p. 22) from oranges at Masenderan. The specimens were determined by Balachowsky and the record is therefore authentic. We have not found the species in our material.

39. Aonidiella orientalis Newst.

This species is represented in our material from Khousistan on orange leaves, Mazenderan and Gorgan on the same host, also from *Citrus* near Bender Abbas and in Khousistan. All these specimens show the strong sclerotisation of the prosoma and are easily separated from *Aonidiella aurantii* by the presence of genacerores. The species was mentioned by Lindinger (1909, p. 108) from Bender Abbas on leaves of *Ficus* spec.

40. Chrysomphalus dictyospermi Morg.

Recorded by Afchar (p. 18) from Mazenderan, Gilan and Gorgan on *Citrus*. We have it from Karaj, Mazenderan, Bender Guez, Gorgan, Resht and Shiras on *Citrus*, ornamental palms, *Pistacia mutica*, and apricot. The species is undoubtedly one of the most injurious scale insects of *Citrus* in Iran.

41. Thymaspis salicis nov. spec.

Scale of adult female round or elongate, moderately convex, covered by a dense layer of whitish secretion, pale yellowish. Exuviae excentric, also yellow. 1.0×1.0 to 1.5×0.8 mm.

Body shape short oval, pygidium in old females restricted, broadest about or just before the middle of body.

Antennae short, tubercles with one short, stout and slightly curved seta. Spiracles short, dumb bell shaped, with very broad inner ending, no paraspiracular pores.

Pygidium broadly rounded, not protruding. Pygidial margin with two prominent median lobes which are rather distant. Median lobes slightly divergent, broader at end than at base, broadly rounded on caudad margin, with no or very faintly indicated notches only. Second lobes usually much shorter, very slender triangular, or almost absent. Third lobes usually absent, sometimes appearing as a minute replica of the second lobes. Short broad tubular ducts are arranged along the margin as follows : one between the median lobes ; one between L_1 and L_2, which are rather approached ; usually two between L_2 and L_3, which are much distant ; and eventually one to three such duct openings further laterad. Their number is variable, fluctuating between a total of 3 to 6 each side. Correspondingly fluctuates the number of plates : 1 (or 2) in the median interval, 1 between L_1 and L_2, almost as long as the second lobe, narrow, elongate, with serrate caudal margin. Very short or no lobes further laterad, but a few marginal setae.

Anus ovate, at 3/4 distance of base margin of pygidium. Dorsal laterae and marginal area with many very slender, elongate tubular ducts with

small circular pores. Vagina about central. Genacerores in three groups, the lateral groups usually in clearly defined area : $\frac{5(2\text{-}\ 8)}{12(8\text{-}14).}$ $\frac{}{8(6\text{-}\ 9)}$

The species differs from *T. artemisiae* Hall mainly by the shape and location of pygidial lobes and the large number of genacerores.

Teheran, on bark of *Salix* spec., July 1943.

42. Diaspis calyptroides Costa.

On *Opuntia* spec., in garden at Teheran.

43. Diaspis visci Schr.

On *Thuja* leaves at Ab Ali.

44. Diaspis syriaca Lindgr.

Mentioned by Lindinger (1931, p. 121) from Hajiabad on *Pistacia khinjuk*. Zagros near Kermanshah on leaves of the same host.

45. Aulacaspis rosae Sdbg.

Mentioned by Afchar (p. 44) on roses. We have seen material from Teheran and Mazanderan.

46. Mytilococcus beckii Newm.

(= *Lepidosaphes pinnaeformis* Bché, and *Lepidosaphes citricola* Pack.).

This species is mentioned by Archangelskaya (1937, p. 74) and by Afchar (p. 27)). Afchar reports that it occurs together with *M. gloverii* Pack. on *Citrus* in Mazenderan. We have not seen the species.

47. Mytilococcus gloverii Pack.

Reported by Afchar (p. 25) from Mazenderan and Gilan on *Citrus*.

48. Mytilococcus juniperi Ldgr.

This common Anatolian species was found on leaves of *Thuja* at Teheran.

49. Mytilococcus kurdicus Bdhmr.

The species was recently described from Iraqi Kurdistan. On leaves of *Platanus orientalis* in old garden at Teheran.

50. Mytilococcus pistaciae Arch.

Recorded by Archangelskaya (1937, p. 70), and by Afchar (p. 27), from Qazwin. We have collected it on this place on the same host (*Pistacia vera*).

51. Mytilococcus ulmi L.

Afchar (p. 30) mentions it from Mazenderan, Gilan and Teheran. On apple twigs from Teheran.

52. Fiorinia afchari nov. spec.

Scale of adult female short, pyriform, dark black-brown, with two processes at the narrower end. Second exuvia entirely covering adult scale. First exuvia terminal, round, light brown.

Body of adult female short elliptic in the early stage, with subparallel sides, suddenly narrowing towards end. Pygidium triangular, protruding. In the old females the body is round, the abdominal segments retracted and the pygidium surrounded by the abdomen almost as in *Aonidiella*, broadest at 2/3 of body length. Prosoma not sclerotic. One seta and one dagger-like process on each margin of the two prepygidial segments. Antennae tubercular with two short, stout setae, one distinctly longer. Mesospiracles with two spiracerores.

Pygidial margin : Median lobes diverging, fused at base, with two hairs on distinct processes in the interval. The free margin is serrate. Laterad follow : 1 seta, 1 dagger-like process which slightly surpasses L_1, 1 oval opening of a short dorso-tubular duct. Second lobes duplex, the centrad lobule triangular or narrow and rounded at end, reaching almost as far as L_1, the distad lobule much smaller, narrow, rounded at end. 1 dagger-like process, 1 seta, (1 or) 2 oval duct openings, 1 seta, 1 dagger-like process, 1 oval duct opening, 1 seta, (1 oval opening), 1 seta, 1 to 4 dagger-like processes. The total number of duct openings fluctuates between 4 and 7 each side. The dagger-like processes also show high variability, sometimes one only present. Anus at 1/3 of distance base margin of pygidium. Four round pores in one row caudad of anus. Vulva just caudad of anus. No genacerores.

Fully developed larvae in the body, some with free extremities. This is possibly the consequence of squeezing during the preparation of the slides. This is another example of a viviparous species without genacerores.

Bender Abbas on *Periploeca aphylla* (Asclepiadaceae) collected by Prof. Sherbinowsky in July 1942. The species is named after Jelal Afchar, the professor of entomology at the agricultural college at Karaj.

53. Chionaspis asiatica Arch.

Recorded by Archangelskaya (1937, p. 70), At Teheran and Karaj on plum.

54. Chionaspis salicis L.

This species is common on *Salix*. Afchar mentions it (p. 44). He has it from Teheran, Arak and Qazmin (i.l.), and Mr. E. P. Wiltshire collected it up to 2700 m. altitude in the Elburs mountains. We have seen it everywhere in and around Teheran.

55. Phenacaspis prunorum Borkhsenius.

A species only recently described from Transcaucasia. We have found it common on quince, plum and apricot, on leaves and twigs at Teheran, Sahne and Karaj. Doubtless, it has been mixed in the past with *Chionaspis asiatica* Arch., as the scales of both species resemble another. There is little doubt that *P. prunorum* Borkh., which sometimes occurs together with *Chionaspis* on the same leaf, is the more common species. Under the microscope they are easily separable, even in simple squeezing preparations : by the deeply sunk in median lobes of *Phenacaspis* as compared with the protruding ones of *Chionaspis*.

56. Parlatoria blanchardi Targ.

Mentioned by Archangelskaya (1937, p. 61), and by Afchar (p. 27). Common on leaves of *Phoenix dactylifera* in Khousistan, from where we had two samples.

57. Parlatoria morrisoni Bdhmr.

A full description of this species is given in this Bulletin (see page 82). We have specimens from Khousistan on twigs of *Zizyphus* (coll. Mr. Kaussari) and from Bender Guez on *Citrus* leaves (coll. Prof. Sherbinowsky).

58. Parlatoria oleae Colv.

Recorded by Archangelskaya (1937, p. 62) and by Afchar (p. 44) from olives in Mazenderan. We have it from plum at Teheran and from *Rhus* spec. and a big Rosaceous shrub in the mountain valley of Pas Qaleh near Teheran.

59. Parlatoria zizyphi Luc.

Afchar (p. 23) mentions it from Mazenderan and Gorgeran on oranges. We have this species from lime fruit and from orange leaves from both these provinces (coll. Afchar and Prof. Sherbinowsky).

60. Parlatoria ephedrae Ldgr.

The species was originally described by Lindinger (1911, p. 129), from Kuh i Jupar at 3400 m. alt. (near Kerman), from *Ephedra*, and recorded again by the same author (1931, p. 121), from Karmaru, on *Ephedra nebrodensis procera*. We have it from Pas Qaleh on branches of *Ephedra*.

61. Salicicola kermanensis Ldgr.

Described by Lindinger (1905, p. 253) from Kerman and Yezd on stem of *Populus alba*. We have it from stem of *Populus* and *Salix* spp. at Pas Qaleh, Bissotoun and Abeh.

62. Suturaspis pistaciae Ldgr.

On twigs of *Pistacia khinjuk* in Zagros near Kermanshah.

III. ZOOGEOGRAPHICAL ANALYSIS

Little is known on the zoogeography of Iran. But in broad outlines all northern and central parts belong to the Irano-Turanian region, the extreme South to the Saharo-Sindian region. In spite of the small size of the list of Coccoidea known so far from Iran, their distribution well confirms this division.

The following 15 species are Cultural Immigrants without zoogeographical importance :

Icerya purchasi Mask., *Coccus hesperidum* L., *Pulvinaria floccifera* Westw., *Ceroplastes sinensis* Del Guerc., *Pseudococcus citri* Risso, *Aspidiotus hederae* Vall., *Aonidiella aurantii* Mask., *Aonidiella orientalis* Newst., *Chrysomphalus dictyospermi* Morg., *Diaspis calyptroides* Costa, *Aulacaspis rosae* Sdbg., *Mytilococcus beckii* Newm., *Mytilococcus gloverii* Pack., *Parlatoria morrisoni* Bdhmr., and *Parlatoria zizyphi* Luc.

The two dominating elements in North Iran, or even better from North-West Iran, the only territory from which we have species from endemic hosts, are the Irano-Turanian and the Palaearctic ones. The later group comprises species which occur in at least three of the regions of the Palaearctic kingdom and most of which have their centre of distribution in the Euro-Siberian region. This element is surprisingly strong in North Iran, being represented by no less than 14 species :

Orthezia urticae Linné, *Asterolecanium minus* Lindinger, *Eulecanium bituberculatum* Targ., *Eulecanium coryli* L., *Eulecanium tiliae* L., *Sphaerolecanium prunastri* Fonsc., *Pulvinaria betulae* L., *Eriopeltis festucae* Fonsc., *Phenacoccus aceris* Sign., *Fonscolombia fraxini* Kalt., *Quadraspidiotus ostreaeformis* Curt., *Diaspis visci* Schr., *Mytilococcus ulmi* L., and *Chionaspis salicis* L.

This Palaearctic intrusion is still more outspoken than in North Iraq and has an additional influx road through Azerbeijan and the Caspian plains. It is almost certainly of such imposing magnitude only at high elevations and in mountains, almost not penetrating into the real Iranian steppes, which are still almost unknown with regard to their coccids.

The Irano-Turanian element includes the following 17 species :

Asterolecanium minus Lindinger, *Pulvinaria artemisiae* Licht., *Pulvinaria pistaciae* Bdhmr., *Filippia ephedrae* Newst., *Phenacoccus euphorbiae folius* Bdhmr., *Nidularia balachowskyi* Bdhmr., *Pseudococcus fathyi* nov. spec., *Quadraspidiotus populi* Bdhmr., *Thymaspis salicis* nov. spec., *Mytilococcus juniperi* Ldgr., *Mytilococcus kurdicus* Bdhmr., *Mytilococcus pistaciae* Arch., *Chionaspis asiatica* Arch., *Phenacaspis prunorum* Borkhsenius, *Parlatoria ephedrae* Ldgr., *Parlatoria oleae* Colv., and *Salicicola kermanensis* Ldgr.

No purely Mediterranean species are so far recorded. A small group of 4 species belongs to a Mediterranean/Irano-Turanian connective group. But it is quite possible that further knowledge will reveal some of them as Iranian with Mediterranean penetration only :

Bodenheimera rachelis Bdhmr., *Eulecanium persicae* F., *Diaspis syriaca* Lindgr., and *Suturaspis pistaciae* Ldgr.

Euro-Siberian/Irano-Turanian is *Gossyparia spuria* Mdr.

Seven native coccids are so far known from Khousistan and the coastal margin of the Persian Gulf. All these are Saharo-Sindian :

Phoenicococcus marlatti Ckll., *Asterolecanium phoenicis* Ramachandra, *Filippia gossypii* nov. spec., *Phenacoccus sherbinovskyi* Bdhmr., *Naiacoccus serpentinus minor* Green, *Fiorinia afchari* nov. spec., and *Parlatoria blanchardi* Targ.

The zoogeographical spectrum of these two areas is, hence :

ELEMENT	NORTH-WEST IRAN		SOUTH IRAN	
	Number of Species	Percentage	Number of Species	Percentage
Palaearctic.....	14	38.9	—	—
Irano-Turanian	19.5	54.2	—	—
Mediterranean	2	5.6	—	-
Euro-Siberian	0.5	1.3	—	—
Saharo-Sindian	—	—	7	100
TOTAL...	36		7	

Eliminating the not very characteristic Palaearctic element we obtain 88.6 % Irano-Turanian element for North-West Iran, 100 % Saharo-Sindian element for the extreme South. This is a degree of purity which is rarely reached in other territories of the Middle-East.

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A contribution to our knowledge of *Phyllopertha (Blitopertha) nazarena* Mars., a wheat pest in Palestine

[Coleoptera : Scarabaeidae-Rutilinae]

(with 2 Text-Figures)

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FOREWARD

Although *Phyllopertha (Blitopertha) nazarena* Mars. was described from this region as early as 1878, no damage by this pest was reported until recently. It is possible that outbreaks of it occurred in one or more regions in certain years, but in view of the fact that the insect lives most of its life in the ground, its economic importance has been overlooked until the present time.

The writer encountered this insect as early as 1936, at which time several areas of the wheat fields of Merhavia in the Esdraelon Valley were dried out as a result of an attack of this pest. Since then, breedings of the insect were carried out in the laboratory, and its habits were also studied in the field. The information obtained in the course of this study is presented herewith.

Nature of Damage

Towards the end of December and January, certain areas in a green wheat field become bare, caused by the drying up of the young wheat plants, which by that time have reached a height of from 10-15 cm. When an injured plant is pulled out of the ground, it is apparent that it has dried because its roots were chewed off close to the stem. Upon digging slightly in the ground in the neighbourhood of injured plants, grubs of the Scarabaeid may also be found. These crawl in the ground from plant to plant feeding upon their roots. The injured areas may therefore be quite small at first, but they grow larger and neighbouring infested areas fuse together

into larger fields. Such areas may often cover 10 dunams or more, and there may be many such areas.

Another type of injury is the thinning out of larger fields, which do not become entirely bare; but in such fields, weeds develop rapidly and these cause considerable hardship during the harvest. Thus, in addition to the loss of grain, work of the harvest is greatly hampered as a result of the damage by this pest. In certain years of a heavy infestation, the average yield of a field was only about 25 % of its normal production.

Description

The larva is typical of that of all Scarabaeid, being white, fleshy and curved. At the beginning of its life, it is only 5 mm. long and its head 1 mm. wide, but when mature, a female grub may reach the length of 30 mm. and the head 4.5 mm. wide, while that of the male grub from 3.5-4 mm. wide. The bristles on the last abdominal segment are small and arranged in a manner as illustrated in Figures 1 and 2.

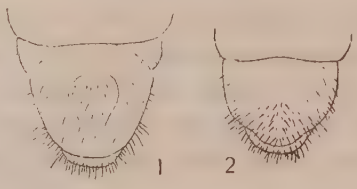

Fig. 1. — Last abdominal segment of larva of *Phyllopertha (Blitopertha) nazarena* Mars., dorsal view.

Fig. 2. — The same, ventral view.

The adult male is from 8 to 12 mm. long, head and thorax brown, with a greenish lustre — in some individuals the greenish lustre is not distinct. The abdomen and legs are brown, the elytra straw-coloured, with a curved dark brown pattern. The pattern varies in the individuals; in some, only traces of the pattern are present at the humeral angle; in others, it reaches from the humeral angle to the middle of the sutural margin of the elytron.

The adult female is larger than the male, and is from 12 to 14 mm. long. The elytra are wider than those of the male, and do not cover the pygidium. In colour, the female resembles the male except that the thorax is brown.

The egg is white, elyptical and about 1.5 mm. long and 1 mm. wide.

Life Cycle

During the early rainy season the larvae are found in the ground in various sizes and ages. Newly hatched larvae are found together with medium or mature larvae, which will shortly pupate.

For convenience's sake, let us follow the development of one of the newly hatched larvae, which is about 5 mm. long and its head 1 mm. wide.

The writer was never successful in breeding the eggs to the time of their hatching. Apparently the new larva hatched out of its egg at the beginning of the rainy season. No larvae are active in the ground during the summer.

Upon hatching, the larva finds young roots in the ground, either of germinating seeds, or of young plants, upon which it feeds. In the laboratory, larvae were bred in glass jars and were forced by special arrangement in the jar to be active along the transparent walls of the jar, in order that they might be observed. From these observations it is evident that the grubs are active only at night. This seems to be true also in the field, inasmuch as in the daytime larvae were always discovered curled up in their cells. Their activity continues thus for about tree months. By the end of March, the grub enters deeper into the ground to about a depth of 40 cm. It constructs a cell therein and remains inactive throughout the summer. The construction of the cell is made simply by widening of the tunnel by means of moving the body forward and downward much like the somersault play of children. It remains in this cell throughout the spring and summer inactive. With the beginning of the rainy season of the following year, the larva migrates upward and resumes its former activity, continuing to be active throughout the winter. It has moulted in the meantime and has reached the size of 1.5-2 cm. and its head has grown from 1 mm. to 2.5-3 mm. It continues to be active throughout the winter and towards the end of this season it penetrates again more deeply into the ground where it remains again until the rainy season, and then comes up again to resume its activities. It has now moulted again and reached the size of 3 cm. and its head from 3.5-4.5 mm. It resumes its activity another winter, at the end of which it penetrates deeper into the ground for pupation.

Pupation takes place in a cell deep in the ground. In the field pupae were dug out from a depth of from 40 to 70 cm. The pupal stage in the laboratory lasted only about ten days, and then the adult emerged from the pupal case. Apparently this is also case in the field. The adult, however, remains in the cell several days, and only after the exoskeleton hardens, which is toward the middle of May, does it emerge from underneath the ground. The adult lives only about 15-20 days and then dies. It may, therefore, be surmized that egg-laying takes place during the month of June.

To summarize the above, we find the larva moults but twice before pupating, namely, during the rest period, which takes place between two activity periods. Whether this takes place at the beginning of the diapose. shorlty after the end of the past winter, or at the end of the diapose period, shortly after the coming winter, could not be established in the field. The breedings of the laboratory indicated it to be at the end of the diapose.

The outstanding features in the life history of this Scarabaeid is the fact that it requires three years to complete its life cycle. This fact is not new, for it is typical to many members of this family, whose life cycle has been studied by various investigators in Europe and America. However, this fact may be questioned as far as Palestinian insects are concerned, for the climate of this country is far warmer than that of colder localities, where insects of this family have been studied. The question arises especially when we know that some insects of this family in Palestine complete their life history within one year.

It should be emphasized, therefore, that this conclusion is based upon labcratory breedings of larvae collected in the field. In these instances not all of the larvae collected in the field and which were of approximately the same size pupated. Only those whose heads were about 4 mm. or more wide, pupated; those whose heads were from 3 to 3.5 mm. did not pupate.

A newly hatched grub grew very little after one season's feeding, and its size was far from being mature for pupation. Grubs, the heads of which were 1.5 mm. wide in February, remained in this state until late March, and only after the following autumn, by December 27th, did the heads grow to 3 mm. in width. Even medium sized grubs did not reach the mature size for pupation after one winter's feeding. Grubs, the heads of which were 3-3.5 mm. in February, did not pupate the following spring. Only grubs whose heads were 4.5 mm. in February pupated and emerged as females; those whose heads were 3.5-4 mm. pupated as males. Furthermore, let us not forget the fact that during the activity period of this insect, the ecological conditions are very much like those in the colder regions, for its diapose here is in the summer, while with the more northern Scarabaeids, the diapose is in the winter. Here it is active during the winter, when conditions are very much like the European summer when the grubs are active there.

Another outstanding feature is the fact that unlike American or European species, there are no marked « broods », but the broods overlap, and in the field one is liable to find newly hatched larvae of one brood together with two seasons' old larvae, and with larvae which go through the third feeding season. Needless to say, this fact may hamper greatly the control by means of crop rotation.

Habits of Adults

Activity

From the middle of May until late in June, adults of *Phyllopertha* (*Blitopertha*) *nazarena* Mars. may be found in infested fields in the morning hours from about 8-10 o'clock, and in the afternoon from 4-6 o'clock. In the early morning, midday and late afternoon, they hide in the ground.

If we study the daily temperature fluctuations of late May and early June at Ein-Harod, which is not far from Merhavia, we find the following: from eight to about ten o'clock in the morning, the temperature ranges from 23 to 30° C. From 10 a.m. to 4 p.m., the temperature is from 28 to 32° C, and from 4 to 6 p.m., the temperature ranges again from 22 to 29° C. The temperature during the daytime, before eight and after six p.m. is from 19 to 22° C. Consequently it is a very simple matter to establish the range of temperature of the normal activity of the adult as being from 23 to 29° C.

Several hundreds of specimens were caught on these occasions, and all of them were males. Only once was a female caught, and since then no other females were captured. In the breedings in the laboratory, the ratio between males and females was about equal, and there is no reason to believe this is not the case in nature. However, the females hide in the crevices in the ground and are not active above the soil. The males are seen in those hours hovering about 20 to 40 cm. above the ground, very much like the hovering of bees before their entrance into the hive. Or they may be seen standing on a straw or dried stick, with antennae outstretched against the breeze. In either case, they are busy trying to locate the females. Should one hovering beetle be followed, it might be seen disappearing after a short time in a crevice in the ground; no doubt a female is waiting there.

Feeding

Never was an adult of either sex observed feeding. Several males were collected from the field and various leaves of grasses, shrubs and trees were offered them, but none of these were ever accepted. The females and males reared in the laboratory also took no food.

Dissections of fifty males showed that the alimentary canal is void, containing nothing except stomach juice. It is evident, therefore, that the adult beetle does not feed but relies upon the nourishment stored up in its body during the long larval period in the form of fat.

Egg-laying

No egg-laying was observed in the field. The *Phyllopertha* occurs in clay soil. Such soil is full of crevices in the summer, which are often 10 cm.

wide, and even one metre or more deep. In these crevices the beetles enter for mating, and it is probable that in these very crevices egg-laying takes place. Apparently the depth chosen is that where the moisture of the ground is not subject to the fluctuations of the atmospheric humidity. About ten females were reared in the laboratory, but as far as reproduction, without success. Of all these, only one mated. The others were not seen to mate. Only one of all of these laid one egg; the others died before leaving any progeny. Upon dissecting the females after they had died, 16 eggs were found in one female. The others had far less than this number. The actual number of eggs laid by one female may be slightly higher than the number mentioned above, but probably not much more, considering the short life of the adult, and the large size of the eggs.

Habits of Larvae

In the breedings in the laboratory, it was noticed as mentioned above, that the larvae are active at night and are dormant during the daytime. The cages in which the larvae lived showed traces of movement from one place to the other. Naturally one of the factors controlling these movements is the search for food, and from all evidence the larva can crawl a few meters each night in the ground in order to obtain its food. Another factor controlling its movements is the amount of moisture in the ground. It seems that the larva actively migrates to optimal conditions of moisture, because larvae seem to be very susceptible to the changes of the moisture in the ground. When the upper layers of soil are too dry, one finds the larvae in lower layers about 8-10 cm. deep. On the other hand, when there is much rainfall and the lower layers of the soil are saturated and not well aereated, the grubs migrate upwards close to the surface. When the end of March comes, and the soil dries more deeply, the larva migrates deeper until it reaches the place where moisture is constantly retained.

Once the larva has entered into the state of diapose, it can no longer migrate to optional conditions of moisture. In the breedings in the laboratory, several specimens died during the summer, when conditions in the ground were not favorable.

Factors Affecting Distribution

Not in all soils can the optimal conditions of moisture and aeration be obtained. For instance, the soil of Merhavia, were it not drained, could not offer the optimal conditions for the larvae. For this reason most infested fields are those which are on the top of the round flat hills or on their slopes, where drainage is very effective. On scouting in the soils of Affule or Balfouria, which are adjacent to and quite close to Merhavia, no *Phyllo-*

pertha infestations were ever discovered. The soil in these places is exactly the same as that of Merhavia, and the grubs could live there if drainage were available. These grounds are flat, and when it rains the water remains stagnant for a few days. Such conditions are unfavourable for this insect.

Sandy soils are too dry and unfavourable. The beetle is restricted, therefore, to clay soils in the regions of the Esdraelon Valley, on the slopes of the hills in the neighbourhood of Nazareth, Merhavia, Kefar Tabor. Bissan, Beit-Alfa, et caetera. And in the coastal plain, they are found along the slopy fields of hills. It was reported from Hadera, Petach-Tikvah, Hulda, Kfar Menachem, et caetera.

No detailed records can be given regarding the spread of this pest or the growth of its intensity from year to year because of the crop rotation factor. In some places, a four year cycle crop rotation is followed. The general impression, however, is that the pest spreads and recently appeared in such areas where it had previously not been noticed.

Thus it was recorded for the first time from the Gilboa region in 1942, from the Central Carmel region in 1943, and from Nahalal in 1944.

In a field heavily infested, over 100 larvae were collected from one square metre.

Control

Fumigants

Three control experiments on a small scale, carried out at Merhavia by Dr. Schweig (*Hassadeh*, 1939, Field Crop in Palestine, pp. 354 [in Hebrew]) of the Palestine Government Experiment Station, Acre, showed that the application of calcium cyanimide at the ratio of 50 kgs. per dunam, hardly killed the larvae. Paradichlorobenzene at the ratio of 30 kgs. per dunam caused about a 50% mortality, while the application of naphthalene flakes at the ratio of 40 kgs. per dunam, brought about 90% mortality. The application of an insecticide might be considered if lawns were attacked, but it is out of the question to use it in large fields because of the cost of this fumigant.

Chemotropism

Although it was definitely established that the adults do not feed, nevertheless some volatile oils were mixed with bran and syrup to act as attrahents for the adults. The traps were placed in the field, where adult males were abundant. The experiments were conducted for an entire week, using a different volatile oil such as geraniol, eugeniol, menthol and others every day. However, not a single beetle was ever captured, while other

insects such as moths, flies, bees and others were caught in considerable numbers.

Crop Rotation

It was presumed that if a field were clean of *Gramineae* for two or three years, the *Phyllopertha* grubs therein would be starved and killed, and the field would remain free from the pest. Upon this assumption, an experiment was carried out at Merhavia, wherein wheat was sown only once in three years in one field, and once in four years in another. A field that grew wheat in the winter of 1937 was not sown with this crop again until in the winter of 1940, and in the second field in the winter of 1941. At the end of this period, however, the fields were infested just as they were when this crop was last sown on it. This method cannot be considered effective.

Biological Control

In some countries, hogs and poultry are allowed on a field to clean the grubs. However, because of the type of farming in this country, this cannot be done, except with especial great effort.

Observations on *Brachycolus brassicæ* L. in Palestine

[Hemiptera : Aphidoidea]

by D. L. Elze

The life cycle of the cabbage aphis *Brachycolus brassicae* L. was studied at Rishon le Zion along the lines on which Davis (1), Smith (2), and others have studied a number of Aphidoidea. The initial individuals for the breedings were collected in November 1935 as almost fully grown nymphs from cabbage (*Brassica oleracea* L.) and from the weed *Brassica tournefortii* Gou. Some of these proved to be *Aphis pseudobrassicae* Dav. They did not grow well on cabbage and died soon. Cabbage is certainly not its preferred host. From the same hosts other individuals were collected until February 1936. The breedings were ended in July 1936. Five independent series of generations were grown. The results are fairly consistent. Number of offspring, duration of development, longevity, number of generations are compiled for all breedings in the following four Tables.

Duration of development ranged in the averages from 10 to 13 days. The individual development ranged from 6 to 21 days, being short during the summer, long during winter. The adult longevity fluctuated between 17 and 26 days. 23 to 32 young per female were born i.e., about 1-2 young per day, 3 or 4 young per day being rather exceptional. The egg production is rather low when compared with that of other aphids (cf. Smith, Davis, Wadley (3).

Almost all the offspring in our breedings were apterae viviparae. The number of alatae viviparae was extremely low. In all series together were born : one in May, five in June, and one in July. An exception was one mother of series II, which had eight alatae among a total of 46 young.

(1) J. J. Davis: U.S. Dept. Agr., Bull. 276, 1915.
(2) L. B. Smith: Virginia Truck Crop Exp. Sta., Bull. 27, 1919.
(3) F. M. Wadley, *Ann. Ent. Soc. Amer.*, 24, 1931, pp. 325-395.

During the same three months and earlier, alates were common on *Brassica tournefortii* Gou. in nature.

TABLE I

Average results of the Series

SERIES	MOTHER-APHID	HOST-PLANT OF THE MOTHER-APHID	DATE OF FIRST YOUNG BORN	NUMBER OF FIRST AND LAST GENERATIONS BORN	AVERAGE NUMBER OF YOUNG	AVERAGE NUMBER-DAYS OF DEVELOPMENT	AVERAGE DURATION OF LIFE IN DAYS
I	winged	cabbage	24.XI.1935	22	30	12	35
II	winged	*Brassica*	22.I.1936	13	30	13	38
III	winged	*tournefortii*	21 I.1936	20	28	12	30
IV	wingless	cabbage	21.II.1936	18	28	10	30.5
V	wingless	cabbage	23.II.1936	15	28	11	30

TABLE II

Average results of first born

SERIES	NUMBER OF GENERATIONS	AVERAGE NUMBER OF YOUNG	MINIMUM AND MAXIMUM	AVERAGE NUMBER-DAYS OF DEVELOPMENT	MINIMUM AND MAXIMUM	AVERAGE DURATION OF ADULT LIFE	MINIMUM AND MAXIMUM
I	15	31	7-59	12	7-18	24	9-40
II	10	32	17-54	13	7-21	26	15-38
III	14	27	16-43	11.5	7-20	19	8-32
IV	13	28	8-44	10	6-16	21	8-30
V	11	26	18-41	10	7-15	17	12-29

TABLE III

Average results of last born

SERIES	NUMBER OF GENERATIONS	AVERAGE NUMBER OF YOUNG	MINIMUM AND MAXIMUM	AVERAGE NUMBER-DAYS OF DEVELOPMENT	MINIMUM AND MAXIMUM	AVERAGE DURATION OF ADULT LIFE	MINIMUM AND MAXIMUM
I	7	29	11-53	12	8-21	21	13-32
II	3	23	20-28	13	10-15	18	13-28
III	6	29	13-60	12	10-15	18.5	7-37
IV	5	29	9-48	12	8-16	17	8-23
V	4	31	12-39	13	10-15	22	7-30

TABLE IV

Development of offspring of mother-aphid I, alate

NUMBER OF GENERATION	DATE OF					NUMBER OF DAYS			NUMBER OFFSPRING
	BORN	FIRST GROWN	FIRST YOUNG	LAST YOUNG	DEATH	DEVELOPMENT	ADULT LIFE	TOTAL LIFE	
A. First born Generation									
1	23. XI.35	2.XII.35	2.XII.35	29.XII.35	29.XII.35	9	27	36	41
2	2.XII.35	18.XII.35	22.XII.35	20. I.36	22. I.36	16	35	51	29
3	22.XII.35	11. I.36	17. I.36*	20. II.36	19. II.36	20	39	59	30**
4	17. I.36	2. II 36	4. II.36	26. II.36	10 III.36	16	36	52	37
5	5. II.36	18. II.36	23. II.36	15. III.36	18. III.36	13	29	42	46
6	23. II.36	9 III.36	9. III.36	28. III.36	28 III.36	15	19	34	59
7	9. III.36	22. III.36	22. III.36	9. IV.36	14. IV.36	13	18	31	35
8	22. III.36	5. IV.36	5. IV.36†	14. IV.36	14. IV.36	14	9	23	13
9	9. IV.36	19. IV.36	19. IV.36†	6. V.36	13. V.36	10	24	34	32
10	23. IV.36	3. V.36	3. V.36	18. V.36	21. V.36	10	18	28	26
11	3. V.36	13. V.36	13. V.36	24. V.36	7. VI.36	10	25	35	28
12	13. V.36	21. V.36	21. V.36†	7. VI.36	10. VI.36	8	20	28	33
13	?	10. VI.36	11. VI 36	28. VI.36	2.VII.36	—	22	—	36‡
14	11. VI.36	20. VI.36	20. VI.36	28. VI.36	28. VI.36	9	8	17	14
15	20. VI 36	27. VI.36	28. VI.36	7.VII.36	13.VII.36	7	10	17	7

*, on 17.1.36, 6 young born; **, 1 male; †, first young died; ‡, 1 alate female.

B. Last born Generation									
1	24. XI.35	4.XII.35	4.XII.35	9. I.36	15. I.36	10	42	52	35
2	9. I.36	30. I.36	2. II.36	19. II.36	23. II.36	21	24	45	29
3	19. II.36	4. III.36	7. III 36	22. III.36	25. III 36	14	21	35	30
4	22. III.36	2. IV.36	5. IV.36	19. IV.36	23. IV.36	10	21	31	53
5	19. IV.36	29. IV.36	3. V.36	13. V.36	18. V.36	10	19	29	24
6	13. V.36	24. V.36	24. V.36	7. VI 36	7. VI.36	11	14	25	21
7	7. VI.36	15. VI.36	15. VI.36	28. VI 36	28. VI.36	8	13	21	11

The experiment was ended about half July because development of the aphids became poor, and also the host-plants were difficult to grow.

Remarkable was the appearance of sexuales in all series between January and April. Series I : one male in February. Series II : first born series one, two and three with five females and one male; last born series one with three females, and three with three males. Series III : first born one, three, four with four males and three females. Series IV : first born with one male, and last born one with one male. Series V : first born two with one female. Copulation and oviposition were observed in one case.

No sexuales were ever found on cabbage or on *Brassica tournefortii* Gou. in nature.

The rare appearance of alatae vivipara as well as the appearance of sexuales show clearly that the conditions of the experiment are at variance with those under natural conditions. It is difficult to pronounce judgement on the decisive factors. The small number of alatae may well have been caused by the better water supply of the experimental plants and the protection from exposure of both, host and aphid, to the dry khamsin winds. Another factor was certainly that the breedings were made in any case on young leaves only. The production of sexuales was probably the influence of a low light intensity. They were protected before direct sun light. In addition they were grown under cheese cloth. Lack of light induced in *Toxoptera graminum* in indoor experiments appearance of sexuales and increase in the appearance of alatae viviparae (Wadley).

Summary

The cabbage aphid *Brachycolus brassicae* L. was grown on cabbage from November 1935 to July 1936. From five mother aphids the first and the last larvae were grown, and from every first born again the first born, and from the last born again the last born, and so on. The length of development ranged from 6 to 21 days, mainly depending on temperature. The average adult longevity ranged from 17 to 26 days. The total offspring per female was about 30, i.e. an average of one to two young per day. The breeding on young leaves as well as protection before the khamsin winds. lowered the number of alatae viviparae considerably, as compared with nature. During winter a number of sexuales of both sexes was born, whereas no sexuals were ever observed in nature. This, probably, is the consequence of the lowered light intensity of the breedings.

Acknowledgments

The experiments were performed in the field laboratory of Mr. J. D. Oppenheim in the grove of Mr. A. J. Polak. Thanks are offered to both gentlemen for the facilities granted.

The Violet Leaf-Rolling Gall Midge, *Dasyneura (Perrisia) affinis* Kieffer, in Egypt

[Diptera : Cecidomyidae]

(with 7 Text-Illustrations)

by Mohamed Soliman El-Zoheiry,
Director of the Entomological Section,
Ministry of Agriculture, Cairo.

The Violet Leaf-Rolling Gall Midge, *Dasyneura* (*Perrisia*) *affinis* Kieffer, has been observed in Europe and Northern Africa (Algeria), but does not seem to have been noticed hitherto in Egypt. In Dr. Bronislaw Debski's (1) almost complete list of the gall producing insects of Egypt, and which contains also a full chronological nomenclature of the papers dealing with the Egyptian species, no record is found on the occurrence of this ornamental garden plant pest in our country. It was also unknown to F. C. Willcocks (2). However, violet (*Viola odorata* L.) is grown here long ago; the earlier record to my knowledge being that given by P. Ascherson and G. Schweinfurth (3). Eversince, this plant is widely cultivated everywhere, and particularly in the Cairo and Alexandria gardens.

The Violet Leaf-Rolling Gall Midge, *Dasyneura* (*Perrisia*) *affinis* Kieffer, is undoubtedly of recent introduction. It has been observed for the first time, in June 1937, at the Royal Gardens of Kubba Palace. Later, it was collected by Mahmud Taher Effendi, Technical Assistant to our Entomological Section, from the gardens of Mrs. Little at Zamalek, and the

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(1) *Liste des Cécidies signalées en Egypte jusqu'à ce jour.* Mém. Soc. Entom. Egypte, vol. I, fasc. 4, 38 pp., Le Caire, 1918.

(2) *A Survey of the more important economic Insects and Mites of Egypt, etc.*, Bull. N° 1, Technical Section, Sultanic Agricultural Society, Cairo, 1922.

(3) *Illustration de la flore d'Egypte,* Mém. Inst. Egyptien, tome II, p. 45, Le Caire, 1889

late Mustafa Amr Pasha at Giza (Pyramids Road), on the 10th and 16th of November 1941, respectively. A survey carried out in 1942 and 1943, has shown that this troublesome pest is present in Cairo, Heliopolis, the districts from Zeitoun to El-Marg and from Maadi to Helwan, Zamalek, Dokki, Giza and the Giza-Pyramids district. It was also collected from Shebin El-Kom (Menufia Province), Beni-Suef and Assiut.

Origin and Nature of the Injury

The female gall midge introduces her eggs inside the tissue of the posterior edges of the outermost leaves. Gradually, the colour of these parts

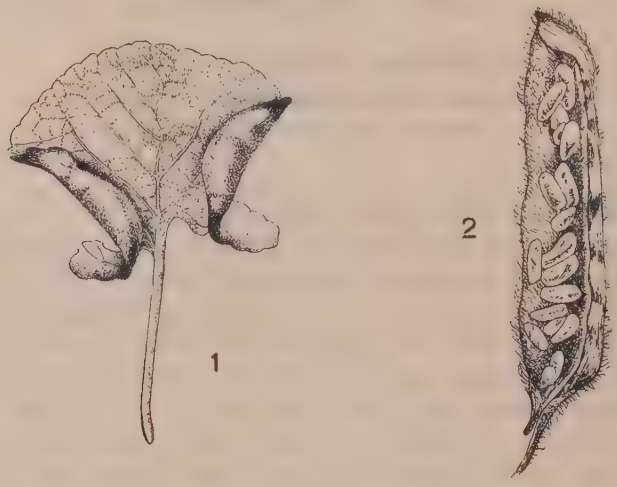


Fig. 1. — Infested leaf showing rolled edges (full size).

Fig. 2. — Larvae inside the gall (× 3).

changes, assuming a paler green tinge than that of the other parts of the leaf. The edges start rolling in the direction of the superior side of the leaf (fig. 1), their texture alters, thickens (fig. 3) and hardens, becoming partially lignified (fig. 3 *l*). This constitutes the gall. The larvae live gregariously within the gall (fig. 2), amongst a mucilaginous substance, and construct their cocoon of compact silk, not of woven filaments. The development of the gall is concomitant to that of the larvae. In about fifty days, it reaches its final shape and size. At the time of the hatching of the adults, the gall assumes a darker colour, unrolls partially, the empty cocoons may be seen inside the gall, and the leaf falls. Infested violet

plants are easily recognized. The attack causes leaf-rolling and hinders the growth of the leaves and of the plant which appears stunted.

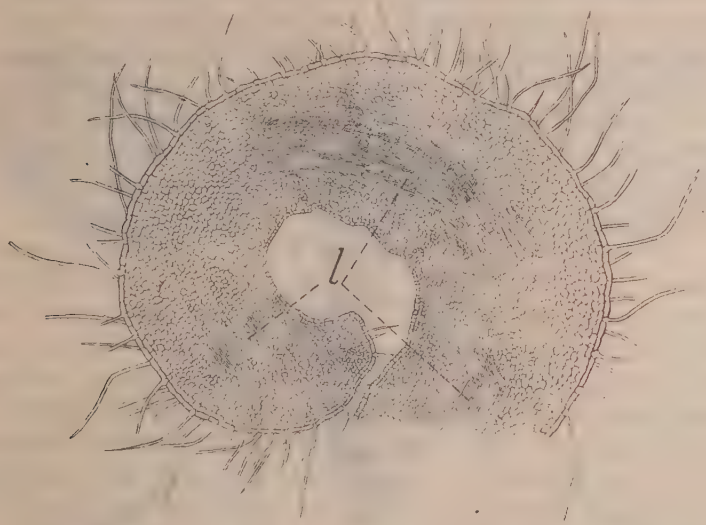


Fig. 3. — Transverse section in a gall showing the alteration of the leaf tissue; *l*, lignified areas (× 20).

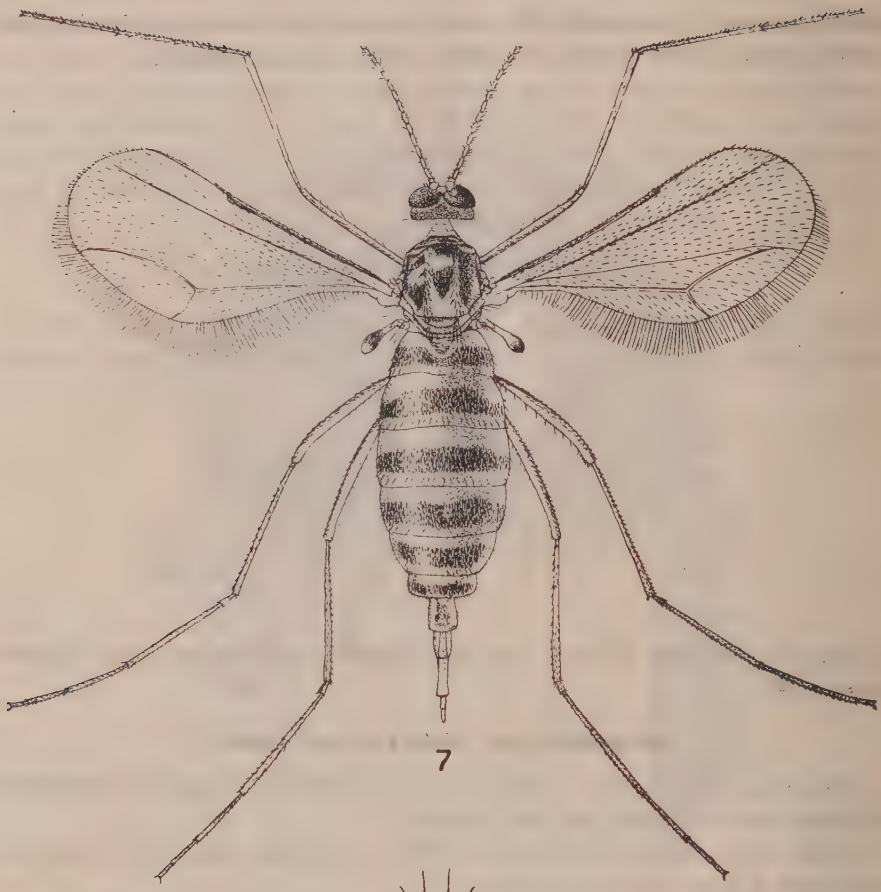
Morphology and Biology of the Insect

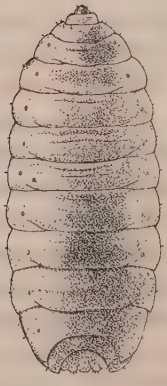
The main characteristic features of the different stages of *Dasyneura* (*Perrisia*) *affinis* Kieffer are the following :

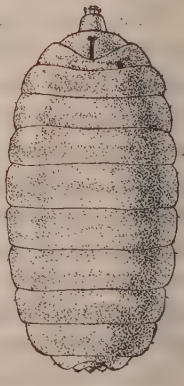
The *egg* is yellowish-white, cylindrical, with both extremities rounded, about 250 μ long, and 50 μ broad.

The *larva* (fig. 4 and 5) is composed of fourteen segments, of which two cephalic, three thoracic, and nine abdominal. Colour variable, hyaline whitish, pale yellowish, and pale pinkish, according to its different instars. Newly hatched larvae measure one millimetre in length, the full grown ones reach about two millimetres. Dorsally, the head is cone-shaped, with the front directed forward; its base is swollen and bears the antennae. Antennae provided with a small basal swelling concentrically striated, and with a twig runned by longitudinal undulated lines and a few concentric ones, and finally with a tiny terminal papilla. Ventrally, the third segment bears a bifurcated sternal spatula, Y-shaped and situated mid-ventrally on the thorax.

The *pupa* (fig. 6) bears two sharp chitinous protuberances in front of the insertion point of the antennae. They are termed the cephalic horns or cervical armature. Their use is to secure the opening of the cocoon or







Dasyneura (Perrisia) affinis Kieffer

Figs. 4 and 5: The larva, dorsal and ventral view respectively. — Fig. 6: The pupa, ventral view. — Fig. 7: The adult female — × 25.

again of the gall. Posteriorly, the apex of the head is provided with two lateral series of cervical papillae, each pair comprising an internal cervical papilla which is inerme, and an external cervical one which bears a long silk. On each lateral anterior part of the clypeus, the superior facial papillae are visible, of which the innermost and posterior bears a short silk. Three inferior facial papillae, of which the innermost is setigerous, are located between the palp sheaths and the eyes' line. There is again an external facial papilla between the eyes and the antennae, ended by a very short silk. Ventrally, the posterior part of the ninth or anal abdominal segment of the female shows an opening, while in the male it bears the sheaths of the forceps.

The *adult* (fig. 7) is a tiny little yellowish creature, with blackish markings on the head and the thorax. Antennae long, fifteen-jointed, the two basal articles short and broad, the following ones narrow, cylindrical in the female, pyriform and ended by a long neck in the male; their surface bears verticillae of applied fillets, and hairs. Maxillary palpi four-jointed. Wings smoky, provided with squamulae, and mainly at their anterior edge; a costal vein, the sub-costal rather short, a discoidal, and a bifurcated postical. Legs long and thin; first joint of the tarsi very short, the last provided with two bifid claws, and with a thick empodium. Female ovipositor membraneous, very long, ending by a thick finger-like process.

Adults emerge all over the spring, summer and autumn. Several generations are liable to occur during the year. Infested violet leaves were collected in all months of the year with the exception of August and December.

Control Measures

It is rather difficult to destroy the larval and pupal stages which are well protected by the gall. Hand-picking and burning of the infested leaves is therefore recommended.

Results of experiments for the control of the Violet Leaf-Rolling Gall Midge carried out by Noman Mohamed Effendi and Mohamed Zaki Effendi, Senior Entomologists to our Entomological Section, have shown that the spraying of violet plants early in Spring with any of the four following insecticides kept the plant free from attack the whole year round. Plants in the same bed without spraying were found infested in the rate of 50 %.

(1) Lime-sulphur mixture (sulphur 2 kgs, quick lime 1 kg., water 100 litres).

(2) Volck May 1 %.

(3) Volck May and nicotine sulfate 1 $^{0}/_{00}$.

(4) Nicotine sulfate 2 $^{0}/_{00}$ and soap $\frac{1}{2}$ %.

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Matériaux pour une Monograghie des *Miscophus* d'Egypte

[Hymenoptera Aculeata : Sphegidae]

(avec Figure)

par le Dr. A.-M. Honoré

Le présent travail n'est pas une Monographie ; il est plus exact de le considérer comme le « Prodrome » d'une Monographie à venir.

On connaissait d'Egypte trois ou quatre espèces de *Miscophus*. En 1883, Kohl décrit, de Tor, *M. ctenopus ;* en 1885, il met en synonymie de *M. ctenopus*, *M. Manzoni* Gribodo, 1885, décrit d'Abyssinie, et *M. sericeus* Radoszkowski, 1876, décrit d'Egypte ; il admet que cette dernière synonymie est douteuse, la description elle-même étant insuffisante. En 1897, le Rév. F. D. Morice décrit *M. aegyptius* des environs du Caire. En 1942, j'ai cité *M. pretiosus* Kohl, 1883, décrit de Corfou, et *M. Nicolaï* Ferton, 1896, du Sud de la France, lapsus calami pour *bonifaciensis* Ferton, 1896 de Corse.

Actuellement, je puis énumérer treize espèces, dont dix nouvelles, qui seront décrites dans les pages qui suivent. Devant une telle disproportion entre choses connues et choses nouvelles, il est évident que le sujet n'est pas épuisé : ce travail n'est que le résultat de ce que l'on pourrait appeler un premier défrichement.

L'étude des *Miscophus* nécessite des moyens optiques assez puissants ; le grossissement en surface sera indiqué [(× 50), (× 70), etc.] chaque fois qu'il sera nécessaire pour définir certains détails, comme le degré de finesse d'une ponctuation ou d'une microsculpture.

GENRE MISCOPHUS JURINE, 1807

Caractères du Genre

Mandibules échancrées à leur bord inféro-externe, le bord interne sans dents. Clypeus court, large, la partie médiane séparée des côtés par une légère incision.

Antennes déliées, insérées très près de la base du clypeus, nettement séparées à la base ; scape épais, pédicelle aussi large que long ; le deuxième article du funicule plus long que le troisième.

Yeux entiers ; leur bord inférieur contigu à la base des mandibules, leurs bords supérieurs généralement quelque peu convergents sur le sommet de la tête ; rarement les bords internes sont parallèle. Front aplati, sans carènes ni protubérences : tempes et vertex médiocrement développés. Ocelles arrondis, bombés, proéminents.

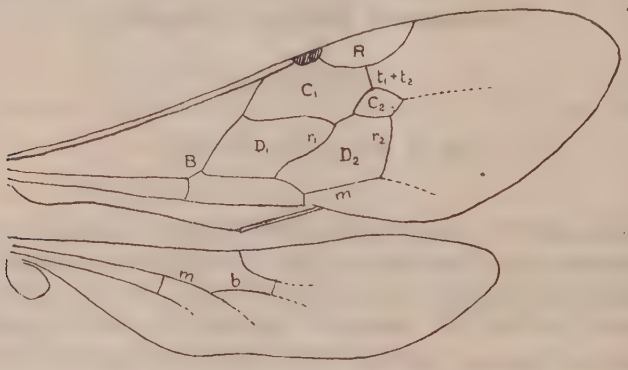

Fig. 1. — Ailes de *Miscophus*, forme typique :

Aile antérieure : B = nervure basale ; C_1 = première cellule cubitale ; C_2 = seconde cellule cubitale ; D_1 et D_2 = deux cellules discoïdales ; m = nervure médiane ; R = cellule radiale ; r_1 et r_2 = deux nervures récurrentes ; $t_1 + t_2$ = pétiole de la cellule cubitale, résultant de la fusion des deux transverses.

Aile inférieure : b = nervure basale ; m = nervure médiane.

Collier du pronotum bien développé, remontant presque sur le même plan que le mésonotum ; les épaulettes n'atteignant pas les écaillettes couvrant les insertions des ailes. Pas de surface épicnémiale aux épisternes prothoraciques ; suture épisternale très visible.

Segment médiaire généralement plus long que large, plus ou moins strié, rarement réticulé, sa face postérieure presque verticale.

L'aire pygidiale manque dans les deux sexes.

Ailes antérieures : Ptérostigma petit. Cellule radiale lancéolée-arrondie sans cellule appendiculaire. Deux cellules cubitales dont la seconde, pétiolée est généralement petite et peut même disparaître. Les deux nervures récurrentes aboutissent l'une à la première cellule cubitale, l'autre dans la seconde cubitale, ou dans son emplacement présumé, ou encore peut devenir interstitielle avec la deuxième nervure transverso-cubitale. Deux cellules discoïdales, dont la seconde peut disparaître (*M. chrysis* Kohl) par effacement de la seconde nervure récurrente et du quatrième secteur de la nervure médiane.

qui à eux deux la déterminent. La nervure basale émerge de la seconde cellule sous-médiane, bien loin après la terminaison de la première cellule sous-médiane.

Ailes inférieures : nervure cubitale émergeant de la nervure médiane. Lobe anal nettement détaché de la base de l'aile, court, guère plus long que la moitié de la cellule sous-médiane.

Pattes généralement fines, à épines peu nombreuses, plus ou moins développées. Peigne tarsal chez la femelle seulement, très variable dans son développement ; chez le mâle, nul ou à peine indiqué. Hanches intermédiaires séparées. Tibias intermédiaires à un seul éperon. Ongles non dentés.

Longueur de 3 à 12 mm.

Distinction des sexes

Mâles : antennes plus courtes, plus robustes, de 13 articles. Segment anal court, largement arrondi. Peigne tarsal nul. Taille plus petite.

Femelles : antennes plus longues, plus grêles, de 12 articles ; segment anal terminé en pointe. Peigne tarsal plus ou moins bien développé aux tarses antérieurs ; taille plus grande.

Coloration

D'un noir plus ou moins brillant, l'abdomen noir, ou rouge, ou taché de rougeâtre. Le thorax peut présenter des reflets bronzés ou métalliques qui peuvent s'étendre à tout le corps.

Ailes hyalines, présentant le plus souvent des taches brunes caractéristiques.

Position systématique et affinités

Le Genre *Miscophus* a été créé par Jurine en 1807, basé sur une seule espèce, le *Miscophus bicolor* Jurine, 1807 : le genre est donc monotypique. Il n'y a pas de synonymes.

Ce genre, nettement délimité, est le principal représentant du groupe *Miscophus* sensu Kohl, 1896 ; ce groupe présente encore, dans la faune paléarctique, deux genres intéressants : *Solierella* Spinola (*Sylaon* Puccioli) et *Nitela* Latreille (1). Le premier représente *Miscophus* à trois cellules cubitales ; le second, par sa nervulation réduite serait plutôt issu du sous-groupe *Miscophus chrysis* Kohl, 1894. Ces deux genres présentent un caractère secondaire, la cellule radiale appendiculée, qui permet de les distinguer facilement du genre *Miscophus*.

On connaît deux genres satellites du genre *Miscophus* : *Saliostethus*

(1) *Solierella* est représenté en Egypte : *S. aegyptia* Schmiedeknecht, 1898; *Nitela* est douteux (existe en Algérie).

Brauns, 1896, avec trois espèces, et *Miscophoïdes* Brauns, 1896, avec une espèce, tous deux de l'Afrique australe ; ces genres restés longtemps peu connus, ont été étudiés par Arnold en 1923 (Sphegidae of South Africa, part IV) ; ils représentent le stade de réduction à l'extrême de la nervulation alaire primitive.

Répartition géographique

Le genre n'est pas très nombreux en espèces. Kohl, en 1896, en connaissait 16, en grande majorité d'Europe Centrale et Méridionale, auxquelles par la suite, on avait ajouté une dizaine d'autres. Le centre de dispersion paraissait donc être le bassin Méditerranéen.

Brauns en 1899, Arnold en 1923 et 1929 en décrivirent une quinzaine de l'Afrique tropicale et australe, élargissant ainsi notablement les limites géographiques du Genre.

En Egypte, nous connaissions *M. ctenopus* Kohl, 1883, et *M. Manzonii* Gribodo, 1884 ; celui-ci considéré pendant longtemps comme un synonyme du précédent ; puis *M. aegyptius* Morice, 1897. *Miscophus bonifaciensis* Ferton, 1896 (2) et *M. pretiosus* Kohl, 1883 (2) doivent être interprétés autrement.

Miscophus sericeus Radoszkowski, 1876, n'a pu être identifié avec certitude.

Je puis énumérer pour la Faune d'Egypte quatorze espèces, dont dix nouvelles qui seront décrites dans ce travail.

Le caractère Méditerranéen du genre *Miscophus* se trouve ainsi renforcé.

Biologie

Les *Miscophus* sont essentiellement sabulicoles ; en Egypte on les trouve surtout en bordure du désert, mais aussi en pleine région des Wadis. On les rencontre surtout au printemps, de Mars en Juin, aux heures les plus chaudes de la journée, posés sur le sable au pied des plantes désertiques. Très vifs d'allures, ils s'envolent soudain pour revenir se poser au même endroit.

Nidification dans le sol ; les araignées emmagasinées ne sont pas complètement tuées, mais immobilisées ; l'approvisionnement est massif, 7 à 12 pièces ; l'œuf est pondu sur la face abdominale de l'une d'elles ; coque nymphale dure et résistante.

(2) A.-M. Honoré, *Bull. Soc. Fouad Ier d'Entom.*, XXVI, 1942, p. 53.

TABLES POUR LA DETERMINATION DES ESPECES DE MISCOPHUS DE LA FAUNE D'EGYPTE

1. Coloration générale du corps d'un noir plus ou moins brillant, ou bronzé à reflets métalliques, sans segment nettement rouge brique à l'abdomen. 2
—. Coloration du thorax brune, noire ou bronzée, abdomen plus ou moins rouge brique, ayant au moins un segment de cette couleur 12
2. Dessus du thorax et du segment médiaire couverts, dans leur partie médiane, de cannelures nettes, saillantes. Aux ailes antérieures, la cellule cubitale pétiolée manque. Coloration d'un bronzé métallique très vif, nuancé de bleu et de violet ..... *Alfierii* n.sp.
—. Dessus du thorax et du segment médiaire lisses ou ponctués, sans cannelures longitudinales saillantes. Aux ailes antérieures, la cellule cubitale pétiolée existe. Coloration noire, avec ou sans reflets bronzés 3
3. Partie médiane du clypeus notablement prolongée en avant, séparée des parties latérales par des échancrures larges et profondes. Corps noir, à reflets bronzés ..... *clypearis* n.sp.
—. Partie médiane du clypeus non fortement prolongée en avant des parties latérales, séparées de celles-ci par des échancrures fines ou même presqu'invisibles 4
4. Ponctuation extrêmement fine, visible (× 30), très espacée. Corps très brillant. Ailes incolores. Longueur 3 mm. ..... *politus* n. sp.
—. Ponctuation très visible (× 15). Taille dépassant généralement 4 mm.... 5
5. Face au-dessus de l'insertion des antennes à ponctuation fine et éparse, laissant les téguments polis, brillants. — Aire dorsale du segment médiaire en ogive, à contours arrondis, non rebordés 6
—. Face au-dessus de l'insertion des antennes à ponctuation plus forte et plus serrée ; téguments ternes, ou peu brillants, sans toutefois paraître polis. — Aire dorsale transversale (sauf *funebris* n.sp., mais alors les ailes supérieures sont très enfumées) 7
6. Ailes transparentes à nervures jaunâtres ; deuxième cellule cubitale aussi grande que la cellule radiale qui est peu allongée. Clypeus aplati, recouvert d'un revêtement pileux appliqué, argenté, à reflets jaunâtres vers le haut, cachant la ponctuation sousjacente. Pattes foncées, tarses clairs. ..... *pretiosus* var. *brunnescens* n.var.
—. Ailes tachetées, portant deux bandes brunes arquées, disposées symétriquement de part et d'autre de la première cellule cubitale et de la deuxième discoïdale ; deuxième cellule cubitale plus petite que la radiale. qui est très allongée, trois fois plus longue que large. Clypeus bombé, ponctué. Pattes entièrement claires ..... *niloticus* n.sp.
7. Ailes supérieures très enfumées, avec une étroite bande d'un blanc

laiteux à l'extrémité de l'aile. Aspect général terne. Partie médiane du clypeus séparée des parties latérales par des échancrures étroites et profondes, de véritables fissures ..... *funebris* n.sp.

—. Ailes antérieures peu enfumées ou hyalines. Aspect général plus brillant, avec, par endroits, des reflets bronzés. Echancrures latérales du clypeus peu marquées ou même nulles 8

8. Clypeus dilaté à son bord antérieur en une lamelle transversale à bord entier, occupant toute la largeur frontale entre le bord inférieur des yeux. Aire dorsale du segment médiaire couverte de stries assez fines disposées en oblique. Les trois premiers segments de l'abdomen garnis latéralement de taches de pruinosité blanchâtre ..... *mimeticus* n.sp.

—. Clypeus normal, échancré de chaque côté de la partie médiane qui peut être légèrement proéminente. Aire dorsale du segment médiaire couverte de stries généralement assez grossières, rarement fines, ou disparaissant par anastomose. Des taches de pruinosité peuvent se rencontrer sur les deux premiers segments de l'abdomen, mais peuvent aussi faire défaut. . 9

9. Le collier du pronotum, vu de côté, présente un profil en ogive : le bord postérieur du collier est creusé en gouttière au fond de laquelle on voit les rudiments de stries transversales ..... *collaris* n.sp.

—. Collier du pronotum à surface plane, son bord postérieur venant à peu près au même niveau avec le bord antérieur du mésonotum dont il n'est séparé que par une fissure peu profonde 10

10. Aire dorsale du segment médiaire de forme nettement carrée, très finement rebordée sur les côtés ; la surface de l'aire déprimée, avec une fine carène médiane, et couverte de rides transversales serrées, très fines (× 50). Tarses antérieurs anormaux, raccourcis, les articles après le métatarse aussi larges que longs ..... *aenigma* n.sp.

—. Tarses antérieurs normaux 11

11. Mésonotum peu brillant, les intervalles des points très finement coriacés ; mésopleures fortement ponctuées-ridées. Aire dorsale du segment médiaire trapézoidale, les stries assez grossières, irrégulières. Longueur 4,5 à 5,5 mm. ..... *aegyptius* Morice

—. Mésonotum brillant, les intervalles entre les points lisses ; mésopleures brillantes comme le mésonotum. Aire dorsale du segment médiaire en ogive, les stries fines et régulièrement disposées. Longueur 3 mm. ..... *frater* n.sp.

12. Abdomen entièrement rouge 13

—. Abdomen plus ou moins marqué ou taché de noir ; généralement les derniers segments noirs en entier ; rarement la coloration noirâtre envahit presque tout l'abdomen, le premier seul restant rougeâtre 15

13. Aire dorsale du segment médiaire fortement ponctuée-chagrinée, sans

traces de sillon médian ni de stries transversales. Longueur 6 à 6,5 mm. ..... *ctenopus* Kohl

—. Aire dorsale du segment médiaire couverte de stries fines et serrées (× 50), disposées transversalement ou en oblique, avec un sillon médian occupant au moins la moitié postérieure de l'aire. Longueur 7-9 mm. 14

14. Bords internes des yeux sensiblement droits, parallèles, la face de largeur uniforme. Aire dorsale du segment médiaire deux fois aussi longue que large à la base, atténuée en arrière, à contours arrondis ; ligne médiane visible dans la moitié postérieure de l'aire. Longueur 8-9 mm. ..... *Manzonii* Grib.

—. Bords internes des yeux légèrement sinueux dans leur tiers supérieur, la face étant ainsi plus large au niveau des ocelles qu'elle ne l'est au niveau de l'insertion des antennes. Aire dorsale une fois et demie aussi longue que large, à contours latéraux accusés mais non rebordés, séparée de la face postérieure par une très fine carène visible de côté, cette carène est échancrée en son milieu ; ligne médiane occupant toute la longueur de l'aire. Longueur 7 mm. ..... *rubriventris* n.sp.

15. Les trois premiers segments de l'abdomen rouges, les suivants noirs ; la séparation des deux colorations est nette. Les segments de coloration foncée sont bordés d'un très mince liseré clair 16

—. La coloration noirâtre à l'abdomen se présente sous forme de taches plus ou moins étendues et mal délimitées : variations de coloration de *ctenopus* et de *Manzonii*, voir ci-dessus ..... 13 et 14

16. Aire dorsale ponctuée, etc., voir 13 ..... *ctenopus* Kohl

—. Aire dorsale striée, etc., voir 14 ..... *Manzonii* Grib. (et *rubriventris* n.sp. ?)

1. Miscophus Alfierii nov. spec.

Type ♀ : Wadi Hoff, Avril ; Co-Type : Wadi Digla, Mai.

Type ♂ : Abou-Rouasch, Avril ; Co-Type : Wadi Hoff, Mai.

♀ : Longueur 5 mm. — D'un noir brillant avec des reflets bleus ou violacés. Mandibules jaunâtres ; les tarses clairs ainsi que les tibias postérieurs, et la base des tibias antérieurs et intermédiaires. Antennes brun de poix foncé. Ailes jaunâtres à la base ; une tâche d'un brun foncé après la première cubitale, dans la partie non caractéristique de l'aile.

Pilosité presque nulle. Quelques poils noirs isolés à la face inférieure et à l'extrémité de l'abdomen. La face inférieure du mésothorax garnie de plaques de poils argentés, appliqués, fugaces.

Clypeus à bord antérieur droit ; au milieu du bord, et légèrement en retrait, il porte une protubérence dentiforme, lisse, tranchant sur la surface ponctuée du clypeus ; cette ponctuation plus forte sur les parties latérales et confluente par endroits.

Antennes insérées dans une dépression fortement ponctuée ; entre l'insertion des antennes et la partie bombée de la face (voir par dessus), il y a une bande transversale, occupant toute la largeur entre les yeux, densément ponctuée, et brillante ; au-dessus de cette bande transversale, la face, partagée en deux par un sillon médian, est brillante, bombée, à ponctuation très fine et très éparse (× 35).

Yeux très convergents vers le sommet de la tête. Au niveau des ocelles postérieurs, leur écartement est sensiblement égal à la longueur du deuxième article du funicule. Ocelles postérieurs équidistants entre eux et avec le bord interne des yeux.

Antennes à scape allongé ; le pédicelle (premier article du funicule) deux fois plus long que large ; le deuxième article égale le double du premier, il est d'un quart plus long que le troisième ou le quatrième.

Collier du prothorax bien développé, portant des stries transversales.

Mésonotum et scutellum portant des stries régulières longitudinales dont les intervalles sont fortement bombés (on pourrait appeler cela des cannelures en relief). Les parties du mésonotum avoisinant les insertions des ailes ne présentent pas de stries de ce genre, mais restent brillantes. Le scutellum est très développé dans le sens antéro-postérieur et recouvre presque complètement le postscutellum qui n'apparaît que comme un point brillant. Mésopleures ponctuées-chagrinées, non striées.

Segment médiaire allongé ; la partie médiane de sa face dorsale porte sept à huit cannelures longitudinales comme celles du thorax ; les bords latéraux sont régulièrement arrondis, lisses et brillants ; les faces latérales portent, sur leur moitié postérieure, quelques stries qui se continuent transversalement sur la paroi arrière ; la partie antérieure des faces latérales est ponctuée, brillante.

Ailes antérieures enfumées ; une plage claire médiane s'étend sur la première cellule cubitale, les deux discoïdales et la seconde submédiane ; la partie extérieure de l'aile est plus foncée que la partie basilaire, avec une zone terminale incolore.

La cellule pétiolée a disparu, et la seconde nervure récurrente, qui normalement devrait y aboutir, est insérée nettement dans la première cellule cubitale. La cellule radiale est plutôt petite ; le secteur de la seconde nervure transverso-cubitale, qui relie normalement la seconde cellule cubitale à la cellule radiale, est resté court, c'est la nervure cubitale qui est remontée pour se joindre à lui. L'espace non caractéristique de l'aile qui s'étend entre la cellule radiale et l'extrémité de l'aile est plus grand qu'à l'ordinaire chez les *Miscophus*, la cellule radiale paraissant ramenée vers le milieu du bord de l'aile. Ailes inférieures incolores ; la cellule médiane très courte ; le secteur extérieur de la nervure médiane invisible.

Pattes longues et grêles ; hanches comprimées, anguleuses, spinulation peu fournie. Peigne tarsal formé de quelques cils longs, noirs.

♂ : Longueur 4-4,5 mm. — Semblable à la femelle comme couleur et sculpture. Antennes plus courtes, le scape moins allongé ; pédicelle un peu plus long que large ; le deuxième article du funicule égale une fois et demie le premier. Antennes mates. Le clypeus ne porte pas la saillie dentiforme indiquée pour la femelle. Peigne tarsal nul.

Cette très remarquable espèce est voisine de *M. Handlirschi* Kohl, 1892, d'Algérie, et de *M. bonifaciensis* Ferton, 1896, de Corse. Le premier est facile à distinguer : l'aile supérieure porte encore la cellule cubitale pétiolée ; la seconde espèce, *M. bonifaciensis*, n'en porte plus ; mais l'écartement minimum des yeux au sommet de la tête, où il atteint la longueur des deux premiers articles du funicule pris ensemble, est bien plus grand que chez *Alfierii ;* la seconde nervure récurrente aboutit, chez *bonifaciensis*, en dehors de la première cellule, à l'emplacement présumé de la seconde cellule cubitale disparue, au contraire, chez *Alfierii*, l'insertion se fait dans la première cellule cubitale elle-même ; tous les individus que j'ai pu examiner ne laissent aucun doute.

Ni Kohl, ni Ferton ne font allusion à la bande brillante susantennaire. On ne peut faire fond sur les différences de sculpture des faces latérales du segment médiaire : il y a des variations individuelles.

La figure 16 de la Planche 12 de J. C. Savigny (Description de l'Egypte, Hist. Nat. Zoologie, Hyménoptères) représente une autre espèce de *Miscophus* apparentée aux trois espèces précédentes, et spécialement à *Alfierii ;* mais elle doit être distincte, si deux détails sont exactement rendus : le clypeus porte une protubérance arrondie, assez volumineuse, au lieu d'une saillie dentiforme aiguë ; le scutellum ne porte pas les cannelures caractéristiques du mésonotum et du segment médiaire. L'insertion de la seconde récurrente se fait dans la première cellule cubitale, comme chez *Alfierii*.

Egypte : Assez commune dans les Wadis du Désert Arabique, et aussi dans le désert Lybique (Abou-Rouasch). Se trouve aussi dans la zone maritime : le Mex (Alexandrie), Ikingi-Mariout, Aboukir, Port-Saïd.

Aire géograpique : Spécial à l'Egypte, jusqu'à maintenant.

C'est cette espèce que j'ai signalée par erreur, en 1942, sous le nom de *Nicolaï* Ferton, 1896.

2. Miscophus clypearis nov. spec.

Type ♂ : Dahschour, 25 Avril 1938.

♂ : Longueur 3 mm. — Coloration d'un bronzé-verdâtre à la tête et au thorax ; abdomen d'un noir assez brillant. Pattes jaunes à fémurs noirs. Base des antennes et mandibules jaunes. Ailes très légèrement enfumées.

Partie médiane du clypeus nettement prolongée en un bec plat, et largement échancré de chaque côté, la largeur des parties latérales est ainsi diminuée ; le centre de la partie médiane est légèrement bombé. Clypeus éparsément ponctué sur toute sa surface, ponctuation doublée par quelques rides grossières.

Face à ponctuation très fine et très dense, avec un fin sillon médian ; haut de la tête densément ponctué. Antennes à articles très courts : scape plus long que les deux premiers articles du funicule. Yeux peu convergents en dessus ; leur écartement minimum sur le vertex est égal à la longueur des quatre premiers articles du funicule pris ensemble. Les ocelles sont en triangle régulier, la distance qui sépare les deux postérieurs entr'eux, égale la distance qui sépare ceux-ci du bord interne des yeux.

Pronotum, mésonotum et scutellum finement ponctués, la ponctuation plus éparse que celle de la tête, les téguments sont plus brillants. A un fort grossissement (× 70), la ponctuation est doublée d'un réseau extrêmement fin, formé de lignes anastomosées ; la ponctuation de l'ensemble du corps est de ce même type sauf les propleures et les mésopleures qui sont nettement ponctuées-réticulées (× 15).

Au segment médiaire, l'aire supérieure est plus large que longue, arrondie en demi-cercle, déprimée au centre et portant dans le creux une carène bien marquée ; la surface de l'aire est fortement et densément ponctuée ; les contours latéraux et postérieurs sont arrondis et ponctués ; les faces latérales sont ponctuées-réticulées, de même que la face postérieure, qui porte une fossette médiane profonde, mais pas de sillon médian.

Abdomen brillant, densément et finement ponctué-réticulé comme le thorax.

Ailes très légèrement enfumées. Cellule radiale environ deux fois aussi grande que la cubitale pétiolée.

Pattes grêles ; spinulation presque nulle.

♀ : Inconnue.

Egypte : Dahschour, en Avril.

Aire géographique : Spécial à l'Egypte.

Espèce très remarquable par la forme insolite du clypeus.

3. Miscophus politus nov. spec.

Type et co-type ♂♂ : Abou-Rouasch, en Mai.

♂ : Longueur 3-3,5 mm. — Noir, brillant avec un reflet bleuâtre sur la tête.

Antennes et pattes noires, tarses brunâtres. Ailes hyalines, les nervures jaunâtres. Pilosité nulle.

Ponctuation générale du corps invisible (× 15), même sur les méso-

pleures ; visible (× 35), extrêmement fine et légère, les intervalles entre les points bien plus grands que les points eux-mêmes.

Clypeus très court, bombé en toit au milieu ; son bord antérieur légèrement arrondi, faiblement denticulé (× 70). Face brusquement bombée immédiatement au-dessus du clypeus, partagée en deux par une fine ligne médiane. Tempes faibles ; face postérieure de la tête non développée derrière les yeux.

Bords internes des yeux incurvés, les yeux également distants en haut et en bas, écartés en haut d'une longueur égale aux trois premiers articles du funicule pris ensemble. Ocelles en triangle aplati, les postérieurs plus distants entre eux qu'ils ne le sont du bord interne des yeux.

Antennes à articles du funicule courts ; le premier (pédicelle) plus long que large ; le deuxième égalant une fois et demie le premier ; les deuxième, troisième et quatrième articles sont de même longueur.

Aire dorsale du segment médiaire plus large que longue, rectangulaire, finement rebordée sur les côtés et à son bord postérieur ; partagée en deux par une très fine carène médiane, et couverte de sillons très fins, obliquement disposés et serrés. Faces latérales du segment couvertes de sillons très fins disposés obliquement en remontant ; face postérieure quelque peu arrondie, striée transversalement avec une impression punctiforme vers le haut.

Ailes antérieures : la cellule radiale égale environ le double de la seconde cubitale. La deuxième nervure récurrente aboutit dans la seconde cellule cubitale.

Abdomen très brillant.

Pattes grêles, à spinulation nulle.

♀ : Inconnue.

Egypte : Abou-Rouasch.

Aire géographique : Spécial à l'Egypte.

4. Miscophus pretiosus Kohl, 1883, nov. var.?

(Type : *Verhandl. Zool.-Bot. Gesellschaft Wien*, XXXIII, p. 351, ♀).

Types : ♀, Wadi Digla, Juin ; ♂, Wadi Digla, Mai.

♀ : Longueur 7,5 mm. — Tête et thorax en entier bronzés, brillants. Mandibules jaunâtres ; antennes brun-foncé, scape jaune en dessous ainsi qu'une partie du pédicelle. Abdomen d'un brun foncé avec le bords des arceaux décolorés ; tarses très clairs avec les épines noires. Ailes absolument hyalines, à nervures jaunâtres.

Clypeus aplati, recouvert d'un revêtement pileux appliqué, argenté, à reflets jaunâtres autour de l'insertion des antennes ; bord antérieur du clypeus quelque peu proéminent, recourbé, non sinué ; la partie médiane séparée des côtés par des incisions.

Face au-dessus des antennes brillante, très finement et très densément

ponctuée, avec un sillon médian net, légèrement bombée de part et d'autre du sillon. Sur les parties bombées, les téguments sont plus brillants tout en étant aussi densément ponctués que les parties voisines. Haut de la tête ponctué comme la face, mais moins brillant.

Yeux à bords internes à peu près parallèles ; leur écartement minimum sur le haut de la tête est égal à la longueur des deux premiers articles du funicule pris ensemble. Ocelles postérieurs écartés entr'eux d'une distance moindre que celle qui les sépare des bords internes des yeux.

Scape épaissi ; le pédicelle plus long que large ; deuxième article du funicule égalant deux fois et demie le premier, et un peu plus long que le troisième.

Pronotum, mésonotum, scutellum et postscutellum densément et très finement ponctués, ponctuation à peine distincte (×15), très visible (×50) ; les téguments brillants, d'un bronze doré très net ; propleures et mésopleures à ponctuation fine et très serrée, à reflets métalliques.

Segment médiaire semi-ovalaire, plus long que large, brillant ; son aire dorsale couverte de très fines stries transversales, recourbées régulièrement vers l'arrière de chaque côté d'un sillon médian qui ne commence qu'après le premier tiers à partir de la base ; les bords latéraux arrondis, lisses. Les faces également couvertes de stries très fines (×30), verticales, inclinées vers l'arrière. La face postérieure est arrondie, striolée transversalement avec un sillon médian marqué d'une impression punctiforme au milieu.

Peigne tarsal formé, au métatarse, de trois cils courts, noirs, et de deux ou trois cils longs de la même couleur ; les deuxième et troisième articles du tarse portent également quelques cils plus longs que les articles eux-mêmes !

♂ : Longueur 7-7,5 mm. — Semblable à la femelle. Antennes plus courtes. Deux longs cils à l'extrémité du métatarse antérieur représentent un peigne tarsal rudimentaire.

Egypte : Wadi Digla, en Mai-Juin, Wadi Um-Mitla (Sinaï), en Avril. L'espèce typique n'est pas connue d'Egypte.

Aire géographique : L'espèce a été décrite de Corfou.

Cette forme se rattache, comme variété de coloration, au *Miscophus pretiosus* Kohl, 1883, décrit de Corfou.

Il y a quelques divergences d'avec la description donnée par Kohl. Ainsi, il n'y a pas les surfaces lisses auxquelles Kohl fait allusion. La tête et le thorax sont couverts d'une ponctuation tellement fine qu'il faut, pour la distinguer, recourir à un grossissement d'au moins 30-40 diamètres ; comme les téguments ont un reflet métallique très net, Kohl a pu être trompé sur ce point. Mes spécimens ne portent pas trace d'un revêtement pileux très ras, de couleur brique, devant se trouver dans l'espace interocellaire ; peut-être ce revêtement est-il très caduc ?

Enfin, l'expression par laquelle il caractérise la sculpture du segment médiaire ne correspond pas très bien à nos exemplaires. Il dit « ... *area dorsalis coriaceo-rugulosa* (L.b)... », c'est-à-dire « *aire dorsale* (*plutôt*) *mate, couverte de rides* (*gross.* ×45) » ; il insiste plus loin sur la fine striation sur fond mat, alors que le segment médiaire est plutôt brillant.

Néanmoins, étant donné l'aspect général caractéristique d'après la description même de Kohl, je ne pense pas que ces divergences puissent justifier la création d'une nouvelle espèce ; il vaut mieux la considérer comme une variété nouvelle, *brunnescens* n.var., représentant le point extrême de coloration foncée pressentie par Kohl pour son espèce, dont la coloration typique pour l'abdomen et les pattes, est d'un brun-jaunâtre clair.

5. Miscophus niloticus nov. spec.

Type ♀ : Hawamdieh, en Juin.

♀ : Longueur 5 mm. — Noire ; mandibules, clypeus, scape et pattes jaunâtres ; prothorax brun-clair, rembruni en dessus. Le dessus de la tête a un léger reflet bronzé. Le mésonotum est couvert de poils mordorés appliqués, très fins (×70). Les hanches des deux paires de pattes postérieures sont également noires. Pilosité nulle ; le dessous du mésothorax offrant quelques taches de pilosité blanche appliquée.

Ailes supérieures tachetées : sur chaque aile, deux taches transversales, courbées, rangées symétriquement de part et d'autre du milieu de l'aile, diffuses vers la base et l'extrémité de l'aile, laissant au centre un espace clair bien délimité, englobant la première cellule cubitale, la moitié extérieure de la première discoïdale et la totalité de la seconde, et le milieu du bord inférieur de l'aile. Les ailes inférieures hyalines.

Face au-dessus de l'insertion des antennes brillante, à ponctuation très fine, apparaissant (×70) comme une très fine striolation ; face partagée en deux par un sillon médian, et bombée de chaque côté de ce sillon. Sommet de la tête finement striolé-ponctué, brillant. Clypeus bombé, ponctué, son bord antérieur sinué au milieu.

Pédicelle des antennes pas très épais, deux fois plus long que large ; le deuxième article du funicule égal au double du premier (pédicelle), et est plus long que les troisième ou quatrième.

Yeux nettement convergents vers le sommet de la tête ; leur plus petit écartement est moindre que la longueur des deux premiers articles du funicule pris ensemble. Ocelles postérieurs plus rapprochés du bord interne des yeux qu'ils ne le sont entr'eux.

Pronotum, mésonotum, scutellum et postscutellum densément ponctués ; propleures (épisternes prothoraciques) à ponctuation coriacée ; mésopleures densément striées dans le sens horizontal.

Surface dorsale du segment médiaire en ogive, assez brillante, couverte de stries très fines disposées régulièrement en biais vers l'arrière, de chaque côté d'une carène médiane fine, très nette ; les contours latéraux arrondis, non rebordés ; les faces latérales portent des stries verticales irrégulièrement disposées et plus ou moins anastomosées en treillis. La face postérieure, rebordée, assez abrupte, transversalement striée, avec un sillon médian marqué, en son milieu, d'une impression punctiforme.

Ailes antérieures : cellule radiale allongée, trois fois aussi longue que large en son milieu ; deux fois aussi grande que la deuxième cellule cubitale ; celle-ci aussi large que haute, presqu'arrondie, sa hauteur égalant le secteur $t_1 + t_2$. Deuxième nervure récurrente interstitielle.

Abdomen densément et très finement ponctué (× 70) ; brillant.

Pattes longues et fines. Peigne tarsal rudimentaire.

♂ : Inconnu.

Egypte : Hawamdieh, en Juin.

Aire géographique : Spécial à l'Egypte.

6. Miscophus funebris nov. spec.

Type et co-type ♀ : Hawamdieh, Novembre-Janvier.

♀ : Longueur 5 mm. — Coloration générale d'un noir mat sur la tête et le thorax ; d'un noir quelque peu brillant sur l'abdomen, dont la base est un peu rougeâtre. Antennes d'un brun-noirâtre, le dessous du scape et du pédicelle jaunâtres ; mandibules d'un brun de poix. Pattes noires. Ailes antérieures enfumées, plus fortement après le milieu de l'aile ; à l'extrême bord extérieur de l'aile antérieure, une étroite bande d'un blanc laiteux faisant nettement opposition avec la partie sombre de l'aile. Ailes postérieures grises.

Ponctuation générale du corps très fine et très dense, donnant à la tête et au thorax un aspect mat ; il y a par place (× 70) de légers reflets bronzés ; propleures et mésopleures également très finement ponctuées, d'un noir quelque peu brillant, sans toutefois présenter de reflets bronzés.

Clypeus court ; partie médiane séparée des parties latérales par des échancrures étroites mais profondes, semblables à des fissures ; bord antérieur presque droit, aplati en lamelle légèrement relevée. Face au-dessus des antennes avec une fine ligne médiane.

Yeux convergents vers le sommet de la tête : la plus petite distance qui les sépare est égale à la longueur des deux premiers articles du funicule réunis. Le deuxième article du funicule est égal au double du premier, et légèrement plus long que le troisième. Ocelles équidistants entr'eux et avec les yeux.

Sur tout le dessus du thorax, la ponctuation est très serrée, confluente même à × 70 ; il en est de même pour les mésopleures.

Segment médiaire en ovale ; la surface dorsale légèrement creusée, avec une ligne médiane nettement marquée. Ponctuation coriacée, mate ; contours accusés mais non rebordés, couverts de cette même ponctuation mate, ainsi que les faces latérales. Face postérieure en ogive aiguë, mate, avec un sillon médian profond.

Pattes épineuses. Peigne tarsal peu fourni, formé de quelques cils noirs assez longs à l'extrémité du métatarse et du deuxième article tarsal.

Abdomen à ponctuation d'une extrême finesse, laissant l'abdomen assez brillant.

Ailes antérieures : cellule radiale un peu plus grande que la deuxième cubitale ; celle-ci plus haute que large, le secteur t_1+t_2 assez court, aboutissant dans le premier tiers de la cellule radiale.

♂ : Inconnu.

Egypte : Hawamdieh, Novembre-Janvier.

Aire géographique : Spécial à l'Egypte.

7. Miscophus mimeticus nov. spec.

Types : ♀, Dahschour, en Juin ; ♂, Kafr-Farouk, Avril.

♀ : Longueur 5 mm. — Noire ; tête mate, le corps plus brillant, avec un vague reflet bronzé. Antennes d'un brun noir, le scape et l'extrémité du pédicelle jaune brunâtre. Mandibules rousses. Pattes noires, les tarses bruns. Ailes enfumées, plus foncées dans leur moitié extérieure.

Pilosité très réduite. Les trois premiers segments de l'abdomen portant de chaque côté des taches de pruinosité blanche peu fournie.

Clypeus dilaté à son bord antérieur en une lamelle transversale à bord entier, occupant toute la largeur frontale ; les petites échancrures qui délimitent de part et d'autre la partie médiane du clypeus ne sont pas visibles ; cette lamelle recouvre complètement les mandibules qui ne sont visibles que par en dessous. Le bord du clypeus proprement dit, à sa jonction avec cette lamelle transversale, est rectiligne sur toute sa longueur et marqué par une ligne de fossettes très petites (× 70). Partie médiane du clypeus bombé et fortement ponctué.

Deuxième article des antennes égal au double du premier et plus grand que le troisième. Le dernier article est aplati sur la face inférieure, la face aplatie porte sur toute sa longueur une rainure médiane (× 70). Scape épaissi ; pédicelle plus long que large.

Yeux convergents sur le sommet de la tête ; la plus courte distance qui les sépare (à la hauteur des ocelles postérieurs) est égale aux deux premiers articles du funicule réunis. Ocelles postérieurs séparés par un espace plus grand que celui qui les sépare du bord interne des yeux.

Ponctuation du pronotum fine et espacée ; celle du mésonotum et du

scutellum plus forte et peu serrée, les espaces entre les points plus grands que le diamètre des points eux-mêmes. Mésopleures à ponctuation ruguleuse, devenant plus concentrée vers le bas des pleures.

Aire dorsale du segment médiaire aussi longue que large, arrondie en demi-cercle ; finement rebordée au milieu de son bord postérieur, les contours latéraux bien indiqués mais non rebordés. Aire partagée en deux par une fine carène, et couverte de stries fines et régulières disposées obliquement vers l'arrière de chaque côté de la carène médiane ; faces latérales densément striées, les stries remontant en biais vers l'extrémité postérieure du segment ; face postérieure arrondie, avec quelques sillons transversaux, et une fossette médiane bien marquée.

Abdomen très finement et densément ponctué ; les trois premiers segments portent de chaque côté des taches de pruinosité blanche, peu fournie. Ces taches donnent à ce *Miscophus* un air tout particulier : il ressemble, à s'y méprendre, à un petit *Tachysphex nitidus* Spinola (à part le système alaire, évidemment).

Les tarses antérieurs sont assez courts, en comparaison des autres espèces ; le peigne tarsal est formé de cils courts, raides, disposés en rang serré sur la face inférieure des articles.

♂ : Longueur 4 mm. — Ressemblant exactement à la femelle ; les taches de pruinosité blanche de l'abdomen n'apparaissent que sur les deux premiers segments ; ceci est peut-être accidentel, car une femelle offre la même particularité.

Egypte : Assez répandu dans les zones cultivées et semi-désertiques (Hawamdieh, Dahschour, Fayoum Km. 53, Kerdacé, Kafr-Farouk, Gebel-Asfar).

Aire géographique : Spécial à l'Egypte.

8. Miscophus aegyptius F.D. Morice, 1897, ♀.

(New or little known Sphegidae from Egypt, *Trans. Ent. Soc. London*, p. 315).

♀ : Longueur 5-5,5 mm. — Noire, assez brillante, avec un vague reflet bronzé. Antennes d'un brun-noir, avec le scape plus clair en dessous. Pattes noires. Ailes légèrement enfumées.

Ponctuation de la tête fine et dense, très concentrée sur la face, moins serrée sur le sommet de la tête, où les téguments sont plus brillants ; la face est plane et sans sillon médian.

Partie médiane du clypeus transversale, la courbure du bord antérieur à peine marquée ; le bord antérieur est légèrement relevé au milieu et denticulé (×70), les échancrures latérales, aux points de contact avec les côtés, sont petites. Le centre de la partie médiane est bombé, relevé en toit, de chaque

côté d'une carène médiane à peine indiquée. L'ensemble est fortement ponctué.

Antennes relativement courtes ; le deuxième article du funicule égale une fois et demie le premier, il est très légèrement plus grand que le troisième. Yeux convergents vers le haut de la tête ; la distance qui les sépare sur le vertex est égale à la longueur des deux premiers articles du funicule réunis. Ocelles en triangle aplati : la distance qui sépare les ocelles postérieurs entr'eux est plus grande que celle qui sépare les ocelles du bord interne des yeux. Arrière de la tête peu développé.

Pronotum, mésonotum et scutellum finement ponctués, tout en conservant un faible brillant ; la ponctuation est moins serrée que sur la face ; propleures et mésopleures fortement ponctuées-ridées. Le collier du pronotum est peu développé, il est plus mince et moins remonté vers le niveau du mésonotum que chez les autres espèces du genre.

Aire dorsale du segment médiaire plus large que longue, trapézoïdale, vaguement rebordée en arrière, les contours latéraux arrondis. Au milieu de l'aire, une carène médiane ; de chaque côté de cette carène, une striation assez grossière disposée obliquement vers l'arrière. Aires latérales fortement ponctuées-ridées, les rides étant plus apparentes vers la suture métasternale, et se continuant sur la face postérieure, qui est confusément striée.

Ailes très légèrement enfumées. Cellule radiale égalant deux fois environ la seconde cellule cubitale pétiolée ; celle-ci plus haute que la longueur du secteur $t_1 + t_2$.

Pattes assez longues ; aux tarses antérieurs le peigne tarsal est médiocrément développé : à peine un ou deux cils pour chacun des trois premiers articles du tarse.

♂ : Inédit. — Type : Sakkara, en Mai.

♂ : Longueur 4 mm. — Ressemble beaucoup à la femelle ; les téguments de l'avant-corps plus brillants ; les sillons obliques de l'aire dorsale du segment médiaire moins fortement indiqués, plus effacés. Antennes plus courtes, le second article du funicule égalant à peine le premier.

Egypte : Environs du Caire (décrit de l'Abbassieh [le Caire]) ; Gebel Asfar, Sakkara ; Fayoum Km. 53.

Aire géographique : Spécial à l'Egypte.

9. Miscophus frater nov. spec.

Type et co-type : 2 ♂♂, route du Fayoum, Km. 53, en Mai.

♂ : Longueur 3.5 mm — Très voisin de *M. aegyptius* F. D. Morice, dont il diffère à première vue par la taille, et par une différence de ponctuation qui le rend plus brillant. Coloration générale noire ; dessous du scape

des antennes et mandibules d'un brun-jaunâtre. Ailes légèrement enfumées, la partie extérieure rembrunie.

Pilosité à peu près nulle.

Clypeus non bombé, à bord antérieur faiblement denticulé. Ponctuation de la face concentrée, plus éparse sur le vertex qui est brillant. Yeux peu convergents ; la plus petite distance qui les sépare sur le vertex est égale à la longueur des trois premiers articles du funicule réunis. Ocelles plus distants entre eux qu'ils ne le sont du bord interne des yeux.

Collier du pronotum plan, son bord antérieur bien accusé ; quelques stries transversales sur les côtés latéraux. Mésonotum et scutellum ponctués, brillants : l'espace entre les points reste brillant tandis qu'il est mat chez *M. aegyptius*. Postscutellum plus ponctué, plus mat. Mésopleures brillantes, la ponctuation comme pour le mésonotum.

Aire dorsale du segment médiaire, avec une carène médiane et des sillons en oblique nettement plus fins et plus serrés que chez *M. aegyptius ;* les faces latérales sillonées de même façon et brillantes. Le bord postérieur de l'aire dorsale tranchant, la face postérieure abrupte et creusée d'une fossette médiane profonde.

Abdomen plus finement et plus éparsement ponctué que chez *M. aegyptius*, brillant.

Ailes antérieures : la cellule cubitale pétiolée moitié moindre que la cellule radiale ; le secteur $t_1 + t_2$ aboutissant vers le milieu de la radiale.

♀ : Inconnue.

Egypte : 2 ♂♂, route du Fayoum, Km. 53.

Aire géographique : Spécial à l'Egypte.

10. Miscophus aenigma nov. spec.

Type ♂ : Hawamdieh, en Mai.

♂ : Longueur 3,5 mm. — Noir, avec un reflet bronzé sur la face : clypeus, dessous des antennes, tarses antérieurs d'un fauve clair ; dessus des antennes et pattes (sauf les tarses antérieures) d'un brun de poix ; ailes teintées de jaunâtre.

Quelques soies argentées au-dessous et autour de l'aire dorsale du segment médiaire ; taches latérales de pruinosité argentée sur les deux premiers segments de l'abdomen ; à part cela, pilosité nulle.

Clypeus très court, arrondi dans son ensemble ; la partie médiane légèrement proéminente ; sur tout son pourtour, le clypeus est rebordé par une lamelle mince, étroite et vaguement denticulée ; la partie médiane du clypeus est nettement bombée et pointillée ; les antennes sont insérées immédiatement au-dessus de la partie bombée, ce qui fait que la surface d'insertion paraît creuse.

Face au-dessus de l'insertion des antennes légèrement bombée, couverte d'une ponctuation extrêmement fine, à peine sensible à ×15, et très dense, très compacte, qui lui donne un aspect d'un noir mat nuancé de vert. Pas de sillon médian. Le haut de la tête est moins mat.

Antennes courtes, comme il est de règle chez les mâles ; le second article du funicule seulement de un quart plus grand que le premier ; à peine plus grand que le troisième et le quatrième. Dernier article non aplati, arrondi, pointu.

Yeux de convergence moyenne, séparés par une distance égale à la longueur des deux premiers articles du funicule des antennes réunis. Ocelles très petits, en triangle surbaissé ; les postérieurs séparés par un espace beaucoup plus grand que celui qui les sépare du bord intérieur des yeux.

Dessus du thorax (pro- et mésonotum) couvert d'une ponctuation très fine et très dense, lui donnant un aspect assez mat ; le scutellum, le post-scutellum et les mésopleures sont moins densément ponctués, plus brillants.

Aire dorsale du segment médiaire carrée, déprimée, ce qui rend plus sensibles les bords latéraux qui sont rebordés par un bourrelet très fin (×70). L'aire dorsale est couverte de stries transversales très fines, à peine sensibles à ×15, nettement visibles à ×50 ; les faces latérales brillantes, à stries obliques peu visibles ; la face postérieure est nettement striée en travers.

Aux ailes antérieures, la cellule cubitale pétiolée est petite, égalant à peine le tiers de la cellule radiale ; sa hauteur est égale à la longueur du secteur $t_1 + t_2$ qui aboutit dans le premier tiers de la cellule radiale ; la seconde nervure récurrente est interstitielle.

Abdomen assez brillant, couvert d'une microsculpture extrêmement fine ; les taches latérales de pilosité blanche peu marquées.

Tarses intermédiaires et postérieurs normaux, à articles distincts, plus longs que larges ; les tarses antérieurs épaissis ; les articles sont aussi longs que larges, étroitement accolés les uns aux autres ; chaque article porte un cil fort, recourbé, aussi long que l'article lui-même.

Si cette forme de tarses *n'est pas d'ordre tératologique*, elle constitue certainement un caractère sexuel des plus remarquables.

♀ : Inconnue.

Egypte : Un mâle, Hawamdieh, en Mai.

Aire géographique : Spécial à l'Egypte.

11. Miscophus ctenopus Kohl, 1883.

(*Verhandl. Zool.-Bot. Gesellschaft Wien*, XXXIII, p. 349, ♂,♀).

♀ : Longueur 6-6,5 mm. — Noire, l'abdomen et les pattes d'un rouge-orangé ; rarement, les derniers segments de l'abdomen sont plus ou moins rembrunis ; mandibules, clypeus, scape et les deux premiers articles du

funicule des antennes jaunâtres, le restant des antennes brunâtre ; les écaillettes jaunes. Ailes subhyalines, très légèrement jaunâtres ; les antérieures présentent une tache d'un bistre-foncé, occupant toute la partie non caractéristique de l'aile, et nettement délimitée à son bord intérieur.

Tête, dessus et côtés du thorax, le segment médiaire en entier, couverts d'une pilosité rase, serrée, d'une nuance grisâtre, donnant aux téguments un reflet bronzé ; sur les côtés et le dessous de la tête, cette pilosité est plus longue et argentée ; elle manque totalement sur le prosternum et sur les hanches. Les segments abdominaux présentent, en dessus, des bandes de pruinosité blanches, chatoyantes. Tout ce revêtement pileux est quelque peu fugace.

Clypeus aplati ; la partie médiane du bord antérieur non proéminente, largement arrondie, les incisions latérales bien marquées. Scape un peu plus court que le deuxième article du funicule des antennes ; ce deuxième article est deux fois aussi long que le premier et un peu plus long que le troisième.

Face plane, densément ponctuée-coriacée ; sillon médian invisible. Bords internes des yeux légèrement sinués dans leur moitié supérieure, la face étant ainsi un peu plus large en haut qu'elle ne l'est au niveau des insertions des antennes.

Ecartement minimum des yeux sur le vertex moindre que la longueur des deux premiers articles du funicule pris ensemble. Ocelles en triangle presque régulier ; les ocelles postérieurs aussi écartés entr'eux qu'ils le sont du bord interne des yeux.

Collier du pronotum peu développé, incliné vers l'avant, très densément ponctué. Le mésonotum, le scutellum et le postscutellum sont couverts d'une ponctuation très fine (× 30), et très dense, donnant aux téguments un aspect mat ; cette ponctuation n'est bien visible que sur une surface dénudée. Sur les mésopleures, la ponctuation est plus grossière et moins mate.

Aire dorsale du segment médiaire, vue de biais, un peu plus longue que large à sa base, peu rétrécie en arrière, les bords latéraux très finement rebordés dans leur moitié postérieure, le bord postérieur anguleux sur les côtés. La surface de l'aire dorsale est fortement chagrinée, sans traces de sillon médian ni de stries transversales. Les côtés latéraux du segment sont fortement chagrinés comme l'aire dorsale ; la face postérieure, presque droite, est grossièrement ponctuée, avec quelques stries en demi-cercle.

Abdomen mat par suite d'une micro-réticulation extrêmement fine.

Pattes longues, à spinulation assez forte de couleur noire, tranchant sur le rouge orange des pattes. Peigne tarsal formé de : au métatarse, trois longs cils noirs, spathuliformes, presqu'aussi longs que le métatarse, précédés de deux autres cils plus fins et moins longs ; à chacun des deux articles suivants, un cil spathuliforme et un autre plus petit.

♂ : Longueur 5-6 mm. — Diffère de la femelle par la coloration de l'abdomen : les trois premiers segments sont rouges, les autres sont d'un brun-noir nettement tranché, avec sur chaque segment un très fin liseré décoloré, blanchâtre. L'écartement minimum des yeux sur le vertex est plus grand que chez la femelle : il est égal à la longueur des trois premiers articles du funicule pris ensemble ; le deuxième article du funicule n'est qu'uun peu plus grand que le premier.

Les mâles avec l'abdomen entièrement rouge comme celui de la femelle doivent être très rares : je n'en connais qu'une seule capture (Wadi Digla, 22.IV.1932).

J'ai admis comme coloration normale, pour la femelle, celle dans laquelle l'abdomen est entièrement rouge. Dans sa description de cette espèce, Kohl dit bien « *segments d'un rouge pâle, plus ou moins noirâtres par places* » ; tant qu'il ne s'agit pas de un ou plusieurs segments nettement et entièrement noirs comme chez le mâle, le noircissement par taches plus ou moins bien délimitées ne signifie rien.

Egypte : En bordure des régions désertiques (Kafr Farouk, Wadi Digla, Abou-Rouasch, Dahschour, Fayoum). — Décrit de Tor (Frauenfeld).

Aire géographique : Egypte, Soudan (Werner [ex Maidi]).

12. Miscophus Manzonii Gribodo, 1884.

(*Ann. Mus. Civico. Stor. Natur. Genova*, Vol. XX, p. 386, No. 12, ♀).

♀ : Longueur 8-9 mm. — Tête et thorax en entier noirs, avec un vague reflet bronzé ; abdomen d'un rouge testacé, les pattes également, moins les hanches qui sont rembrunies, et les épines noires. Scape et les trois premiers articles des antennes d'un jaune-rougeâtre, le restant des antennes rembruni. Clypeus finement rebordé par un liseré jaune, à son bord antérieur. Mandibules jaunes à pointes noires. Ailes subhyalines, les antérieures légèrement grisâtres ; la zone externe enfumée présentant une tache d'un bistre-clair dont les contours sont quelque peu estompés.

Tête, thorax en dessus et sur les côtés, et segment médiaire, couverts d'une pilosité rase, très serrée, argentée avec des reflets donnant aux téguments sous-jacents un aspect bronzé ; sur le clypeus et derrière les yeux, cette pilosité est plus longue et d'un blanc pur ; le dessous du thorax est sans aucune pilosité. Abdomen moins mat que chez *M. ctenopus* Kohl ; les tergites décolorés à leur bord postérieur, et présentant des bandes de fine pilosité argentée, amincies au milieu, élargies sur les côtés et confluentes avec les bandes des segments voisins ; dessous de l'abdomen plus brillant, avec quelques poils raides isolés.

Clypeus aplati, la partie médiane du bord antérieur légèrement proéminente, arrondie, non relevée ; sur le milieu du disque, une très petite carène punctiforme visible surtout quand les téguments sont épilés ; les incisions délimitant la partie médiane sont bien marquées. Scape plus long que le deuxième article du funicule ; ce deuxième article égale deux fois le premier, il est un peu plus long que le troisième.

Face plane, sillon médian à peine visible. Bords internes des yeux presque droits, sensiblement parallèles, la face étant ainsi aussi large en haut qu'en bas au niveau des antennes, mais pas plus large.

Ecartement minimum des yeux sur le vertex plus grand que le premier et le deuxième articles du funicule pris ensemble, mais moindre que les deuxième et troisième ensemble. Ocelles en triangle isocèle, les postérieurs un peu plus écartés qu'ils ne le sont du bord interne des yeux.

Collier du pronotum peu développé, sa paroi antérieure déprimée au milieu, la partie formant col sillonée en travers. Mésonotum, scutellum, postscutellum, mésopleures couverts d'une ponctuation nette, très dense, les intervalles entre les points sont nuls (× 70).

Aire dorsale du segment médiaire, vue de biais, près de deux fois aussi longue que large, très atténuée en arrière, à contours non rebordés, arrondis ; la surface de l'aire est couverte de stries très fines (× 70) et très serrées, disposées en diagonale vers l'arrière de chaque côté d'une ligne médiane presqu'invisible en avant mais bien marquée en arrière ; les faces latérales du segment ont une ponctuation confluente, vaguement striée ; la face postérieure est striée en demi-cercle.

Une microsculpture très fine et très serrée donne à l'abdomen un aspect mat, mais moins prononcé que chez *M. ctenopus* Kohl.

Peigne tarsal formé, comme chez *ctenopus*, de longs cils spathuliformes entremêlés d'autres plus fins et plus courts.

La forme claire décrite ci-dessus est celle qui correspond à la description de Gribodo revue par Guiglio (3) d'après les types. Mais il y a d'autres formes plus ou moins foncées beaucoup plus fréquentes que la forme claire elle-même. Ces variations sont produites par un noircissement plus ou moins étendu de l'abdomen, avec toutes les formes de transition possibles ; les pattes également varient du clair au brun foncé. Il ne peut y avoir aucun intérêt à doter toutes ces formes de noms particuliers. Tout au plus pourrait-on faire excepion en faveur de quelques spécimens isolés à abdomen d'un rouge très clair avec les pattes nettement noires, sauf les tarses : on pourrait appeler cette forme : variété *nigripes* nov.

♂ : Longueur 6-7,5 mm. — Diffère de la femelle par la couleur de

(3) *Ann. Mus. Civ. Storia Nat. Genova*, LVI, 1932-1933.

l'abdomen dont les trois ou quatre derniers segments sont d'un brun-noir nettement délimité. Les pattes sont plus ou moins rembrunies : généralement les fémurs sont noirs. L'écartement minimum des yeux sur le vertex est égal à la longueur des trois premiers articles du funicule des antennes pris ensemble ; le deuxième article du funicule est de moitié plus grand que le premier.

Egypte : Très répandu dans les régions semi-désertiques ; dans la zone maritime, paraît plus commun que *M. ctenopus* Kohl.

Aire géographique : Egypte, Arabie Méridionale (décrit du Yemen).

Kohl, en 1884, considère *M. Manzonii* Gribodo comme un synonyme de *M. ctenopus* Kohl ; il y a évidemment certains rapports entre les deux espèces, mais Kohl ne devait pas connaître *Manzonii* dont la publication avait eu lieu presqu'en même temps que celle de la Monographie de Kohl. Le Dr. Guiglio, en 1933, après une étude comparée des types, montra qu'il y avait deux espèces bien distinctes par les orbites internes des yeux et la sculpture de l'aire dorsale du segment médiaire. Guiglio énumère d'autres différences de moindre importance : écartement des ocelles par rapport à leur diamètre, longueur relative des articles du funicule, etc. ; les différences constatées sont assez subtiles et peuvent bien n'être que des variations individuelles : Guiglio ne connaissait qu'un couple de chacune des deux espèces.

Un caractère, secondaire en lui-même, mais frappant à première vue, nous est fourni par la tache aux ailes supérieures : chez *ctenopus* Kohl, cette tache est d'un bistre très foncé, et nettement délimitée en ligne droite du côté intérieur de l'aile ; chez *Manzonii* Gribodo, cette tache est plus claire, de nuance plutôt jaune-grisâtre, et son bord interne est flou.

13. Miscophus rubriventris nov. spec.

Type : Une femelle, Maadi, 20.VII.1934 (Rabinovitch, in coll. Alfieri).

Co-type : Une femelle, Gebel Asfar, 7.X.1934.

♀ : Longueur 7 mm. — Tête et thorax en entier noirs ; mandibules, bord antérieur du clypeus, scape et pédicelle des antennes, jaunes, le reste des antennes noirâtre ; écaillettes jaunâtres ; abdomen rouge-brique, les pattes également moins les hanches qui sont noires ; spinulation des pattes noire.

Sur la tête et le thorax, une pilosité blanche, appliquée, mais moins dense que chez *ctenopus* Kohl et *Manzonii* Gribodo. A l'abdomen, le bord postérieur des tergites n'est pas décoloré ; il n'y a pas de bandes de pubes-

cence pruineuse. Ailes de teinte légèrement jaunâtre, les nervures jaunes, la tâche apicale aux antérieures bistre-clair, estompée vers l'intérieur.

Partie médiane du clypeus dépassant nettement les parties latérales, et légèrement relevée ; disque du clypeus déprimé, portant en son milieu une carène courte, mais très nette, remontant presque jusqu'à l'espace inter-antennaire. Scape des antennes aussi long que le deuxième article du funicule ; celui-ci est deux fois et demie aussi long que le pédicelle, et plus long que le troisième article..

Face étroite, avec une fine carène médiane dénudée. Yeux très légèrement sinués au bord interne, convergents vers le haut : leur écartement minimum sur le vertex est moindre que la longueur du pédicelle et du deuxième article du funicule pris ensemble, il est un peu plus grand que le deuxième article lui-même. Ocelles en triangle aigu : la distance qui sépare les deux ocelles postérieurs est moindre que celle qui sépare ceux-ci de l'antérieur ; la distance qui sépare les ocelles postérieurs du bord interne des yeux est de très peu inférieure à celle qui sépare les ocelles postérieurs entre eux.

Collier du pronotum normalement développé, densément ponctué. Mésonotum, scutellum et postscutellum à ponctuation extrêmement dense, coriacée. Les mésopleures également.

Segment médiaire peu allongé, son aire dorsale égalant, en longueur, une fois et demie sa largeur à la base ; la face postérieure n'est pas abrupte mais coupée en biais ; les contours latéraux de l'aire dorsale sont arrondis, la face postérieure est séparée de la face dorsale par une très fine carène visible par côté, cette carène est échancrée en son milieu par la prolongation du sillon médian de l'aire dorsale ; celle-ci est couverte de stries très fines (× 50), et très serrées ; les faces latérales également couvertes de stries remontant vers l'arrière ; la face postérieure porte des stries, en demi-cercle, assez fortes.

Abdomen mat, avec une fine microsculpture réticulée.

Pattes longues, principalement les postérieures, dont les fémurs sont presqu'aussi longs que l'abdomen. Peigne tarsal formé de quelques cils forts moins longs et moins spathuliformes que chez *M. ctenopus* et *M. Manzonii*.

Voisin de *M. Manzonii* Gribodo ; en diffère par la partie médiane du clypeus, la longueur du deuxième article du funicule par rapport au premier et par l'aire dorsale du segment médiaire. Les deux espèces ont l'aire dorsale striée, ce qui les distingue immédiatement de *M. ctenopus* Kohl.

Miscophus rubriventris var. *nigripes* nov. (Type : Abou Roasch, en Mai [coll. Alfieri]). — Semblable au type ; les hanches, les fémurs et la moitié postérieure des tibias noirs.

♂ : Inconnu.

Egypte : Maadi, Gebel Asfar.

Aire géographique : Spécial à l'Egypte.

14. Miscophus collaris nov. spec.

Cette espèce, qui figure sous le numéro 9 dans les Tables pour la détermination des espèces, a été perdue avant d'avoir pu en donner une description plus détaillée. Mais devant le caractère particulier du pronotum vu de profil, il y a lieu de la maintenir pour une reconnaissance ultérieure. Cet unique spécimen provenait du Wadi Digla (désert arabique au sud-est du Caire).

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Note sur l'homochromie de *Sceliphron targionii* Car.

[Hymenoptera Aculeata : Sphegidae]

par le Dr. F. Lotte

Ce matin 20 Juin 1944, sortant d'assez bonne heure de chez moi, mon regard se porte sur l'ampoule électrique placée à l'extérieur de la porte d'entrée de ma villa. Peinte en bleu très foncé depuis le début de la guerre, elle me semble, à première vue, recouverte d'une superbe couche de crasse ; mais bientôt je constate que cette couche est animée et qu'elle est constituée, en réalité, par une colonie d'hyménoptères. Il s'agissait de *Sceliphron targionii* Car.

La colonie avait dû passer la nuit sur ce support improvisé. L'endroit était bien choisi, efficacement protégé du vent, comme de la lumière, par un petit auvent de bois. Quelques jours avant, j'avais pris un unique exemplaire de cette espèce sur une vitre de ma clinique, et en avais vu quelques spécimens, le même soir, voletant autour de quelques plants de jasmin en fleurs. De suite la parfaite concordance entre la couleur de ces hyménoptères et celle de la lampe sur laquelle je les avais capturés me frappa. *Sceliphron targionii* Car. est en effet d'une coloration entièrement bleu-violacé.

Je me promis de surveiller la colonie à la tombée de la nuit et, de fait, je fus bien servi. Dès six heures, il y a là tout un essaim, au moins une cinquantaine d'individus déjà groupés sur la lampe ou la survolant d'un vol mou, pattes postérieures traînantes. Tous volètent du côté le plus sombre de la lampe, cherchant à se poser. Homochromie simple, recherche d'un support homochrome ? C'est la première hypothèse qui se présente à l'esprit. Mais c'est à vérifier.

Tout d'abord j'allume la lampe (½ watt). Je n'aperçois qu'un mince filet bleu. Les *Sceliphron* ne bougent pas ; mais leur quiétude est de courte durée, car la lampe chauffe, et bientôt ils décampent, trouvant sans doute leur support trop chaud. J'éteins et je les attend revenir à leur support. Je chasse alors la colonie à grands coups de mouchoir, et à l'ampoule bleue j'en substitue une autre, neuve et de coloration blanche, transparente. Les *Sceliphron* volètent autour de la nouvelle ampoule, viennent reconnaître les

lieux, mais aucun d'eux ne s'y pose. Le support n'est évidemment plus à leur convenance, et ils s'en éloignent, allant se refugier un peu plus haut, à la partie la plus élevée et la plus sombre de l'auvent. Un quart d'heure après, ils s'y sont tous rassemblés. Parmi les nouveaux arrivants, pas un ne se pose sur l'ampoule blanche. Je replace alors l'ancienne ampoule bleue : presque de suite les *Sceliphron* s'y posent, de plus en plus nombreux, pour y passer la nuit, affectionnant encore le côté le plus sombre de la lampe, alors que le côté qui fait face à la lumière reste vierge d'insectes. A la nuit tombée je les retrouve en masse, sur leur support, un peu troublés quelques instants par le rayon investigateur de la torche que je dirige sur leur colonie.

Notons qu'aux heures de pleine insolation le support bleu est déserté, aucun *Sceliphron* n'est visible dans les environs ; mais dès que le jour décline, la colonie revient nicher au même point. Ce soir, 5 Juillet, elle y est encore, aussi nombreuse que d'habitude.

N'ayant trouvé aucun nid de terre aux environs, il m'est impossible de dire si, comme son congénère *Sceliphron spirifex* L., hôte habituel de la maison, et chasseur de petits Salticides (*Plexippus paykulli* entre autres), *Sceliphron targionii* Car. alimente ses larves d'araignées.

En résumé, il semble y avoir un rapport évident entre la coloration du support adopté et celle de l'insecte : le fait m'a semblé suffisamment typique pour justifier cette courte note.

A contribution to the knowledge of the Apioninæ of Cyprus

[Coleoptera : Curculionidae]

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The only collected list of the Apioninae of Cyprus known to me is included in the Insecta lists in Unger and Kotschy, (1865) « Die Insel Cypern ». This list includes 17 effective species and one unnamed as « n. sp. », two of the named species being queried. The British Museum received two small collections (1936-416; 1937-808) from the Island, collected by G. A. Mavromoustakis, amounting in all to some 330 specimens. These, with small amounts of material from various sources already in the Museum, have almost doubled the list of species known in the Island and, as three hitherto undescribed species have been detected in the material, appear to justify a more modern list of the Apioninae of the Island. In addition to examination of specimens, a manuscript list compiled by G. A. Bryant has been made available to me including two species not otherwise recorded, making a present total of thirty-two species listed as being known, in one way or another, from Cyprus. Of these one species remains undescribed, a single female in Mavromoustakis' collections not providing enough material for comparison. One species regarded in Kotschy's list as doubtful is fully confirmed, the other remaining unconfirmed along with five further species of that list of which I have seen no Cypriot material.

As already stated the Mavromoustakis collection includes three undescribed species, one of which (*bifarium* m. infra) may possibly be the *atomarium* Kirby var. of Kotschy's list. Eight speciecs of that collection appear to be the first known representatives from the island. Of the two species added by Bryant's manuscript list the only information known is that they are due to E. E. Green, but material from that source is not at present accessible. One of the two species (*cruentatum* Walt.) is here admitted with reservations as perhaps a misidentification, the known range

being definitely Western European. The eight species not seen by me for the purposes of this paper are indicated by an asterisk.

The list follows Winkler's Catalogue (Cat. Col. reg. Palaearcticae, 1928-32) for subgeneric grouping and order although a number of the names used in that category are still unpublished. They are useful, however, in splitting up this very difficult genus and a study of them with diagnostic characters and a dichotomic Key is in course of preparation.

The following abbreviations are used for the recorder of a species or for collectors of specimens I have seen :

G.A.M. (G.A. Mavromoustakis), T.S. (Th. Shiakides), C.P. (C. Papachrysostomou), L.K. (L. Komites), U.K. (F. Unger and Th. Kotschy), H.M.M. (H.M. Morris), E.E.G. (E.E. Green).

The types of the two new species described herein are in the British Museum (Natural History).

(1)* (*Perapion*) *violaceum* Kirby (E.E.G.).

(2) (*Phrissotrichium*) *tubiferum* Gyll. : Pera Pedi, 3.vii.1937, 1♀ (G.A.M.) ; Pera Pedi, Moniatis, 22.ix.1937, 3♂♂, 3♀♀ (G.A.M.) ; Mt. Troodos, Krios River, 15.vi.1937, 2♂♂, 1♀ (G.A.M.).

(3) (*Pseudapion*) *malvae* Fab. (U.K.) : Nicosia, 9.ii.1934 (T.S.) ; Limassol, 7.v.1933, 1 specimen (G.A.M.) ; ii.1934, 47 specimens (G.A.M.) ; 21.v.1934, 1 specimen (G.A.M.) ; Akrotiri Forest, 14.v.1933, 3 specimens (G.A.M.) ; Mt. Troodos, 9.viii.1937, 2 specimens (G.A.M.) ; Pera Pedi. 12.viii.1937, 1 specimen (G.A.M.) ; Pera Pedi, Krios River, 9.ix.1937, 1 specimen (G.A.M.) ; Pera Pedi, 19.ix.1937, 1 specimen (G.A.M.) ; Kilani, Krios River, 20.ix.1937, 1 specimen (G.A.M.).

(4) (*Aspidapion*) *aeneum* Fab. (U.K.) : Nicosia, 17.xii.1933, 2 specimens (T.S.) ; Limassol, 17,26.v.1934, 2♀♀ (G.A.M.) ; Mt. Troodos, Krios River, 17.vi.1937, 14 specimens (G.A.M.) ; Mt. Troodos, 21.vi.1937, 3 specimens (G.A.M.).

(5) (*Aspidapion*) *radiolus* Kirby (U.K.?) : Pedula, 19.vii.1932, « on Cherry », 3 specimens (C.P.) ; Limassol, iv.1933, 1 specimen (G.A.M.) ; Nicosia, 17.xii.1933, 2 specmens (T.S.) ; Limassol, ii.1934, 2 specimens (G.A.M.) ; Platus, Krios River, 4000 feet, 4.vii.1937, 1 specimen (G.A.M.) ; Mt. Troodos, Mesopotamis, 12.vii.1937, 1 specimen (G.A.M.) ; Mt Troodos, Krios River, 15.vi.1937, 10 specimens (G.A.M.) ; Mt. Troodos, 21.vi.1937, 1 specimen (G.A.M.).

(6) (*Rhopalapion*) *longirostre* Oliv. (U.K.) : Famagusta, 5.vii.1931, « On Cherry », 3 specimens (L.K.).

(7) (*Erythrapion*) *miniatum* Germ. (U.K.) ? var. : Episcopi, 28-29.iv. 1937, 2 specimens (G.A.M.).

(8)* (*Erythrapion*) *cruentatum* Walt. (E.E.G.).

(9) (*Taeniapion*) *semivittatum* Gyll. (U.K.) : « Cyprus, on Wallnut », 19.vii.1927, 1 specimen (H.M.M.) ; Pedula, « on Cherry », 19.vii.1932, 1 specimen (P.C.) ; Limassol, 26.v.1934, 1 specimen (G.A.M.) ; Platus, Krios River, 4.vii.1937, 3 specimens (G.A.M.) ; Mt. Troodos, Mesopotamis, 12.vii.1937, 5 specimens (G.A.M.) ; Pera Pedi, Krios River, 8-10.ix.1937, 11 specimens (G.A.M.) ; Kilani, Krios River, 12.ix.1937, 2 specimens (G.A.M.).

(10) (*Taeniapion*) *rufescens notatum* Wagn. (U.K. as « *rufescens* Gyll. ») : Limassol, xi.1933, 1 specimen (G.A.M.) ; ii.1934, 22 specimens (G.A.M.) ; 31.v.34, 7 specimens (G.A.M.) ; Episcopi, 4.v.1937, 5 specimens (G.A.M.) ; Pera Pedi, Krios River, 9-10.ix.1937, 3 specimens (G.A.M.) ; Kilani, Krios River, 11-13.ix.1937, 18 specimens (G.A.M.) ; Pera Pedi, 18.ix.1937, 3 specimens (G.A.M.) ; Akrotiri Bay, 24-25.xi.1937, 1 specimen (G.A.M.).

(11) Subg. *Thymapion* Deville.

Thymapion Deville, Cat. Col. Bassin Seine, 6 (Suppl.), 1924 : 135 ; *Catapion* Schils., 2 Abth., Kust.-Kraatz, Käf. Eur. 43, 1906 : xxxv ; *Squamapion* Wagner, Col. Centralbl., 3,1929 : 253.

Winkler's Catalogue gives the valid name of the group as *Squamapion* Wagn. and places *Thymapion* Dev. in synonymy. This treatment is inexact since *Thymapion* has five years priority and has a good diagnosis whilst *Squamapion* has no satisfactory diagnosis, being introduced merely by the following phrase : « Schilsky, ..., hat auch in dieser Artengruppe (Subg. *Squamapion* m., nov.) ..... » in dealing with *Apion flavimanum* Gyll. and continued in a footnote : « Schilsky hat, ..., zwei morphologisch und biologisch ziemlich stark differenzierte Artengruppen vereinigt : einerseits die Gruppe des *Apion seniculus* Kby. anderseits die Gruppe von *Apion atomarium* Kby. bis *elongatum* Germ. ».

No subgenotype is cited by either Deville or Wagner. Schilsky, however, in his treatment of *Catapion* (l.c.) splits it up into two « divisions », citing a type for each, *seniculum* for the first, *vicinum* for the second. Both the subgeneric names dealt with here are clearly correspondent with the second group of Schilsky and consequently I hereby cite as subgenotype of *Thymapion* Deville *Apion vicinum* Kirby (1808).

(*Thymapion*) *bifarium* sp. nov.

♂, ♀ : Black, clothed with narrow white hair-scales, the sexual dimorphism rather strong, eyes of the male large and prominent, of the female small and not prominent ; rostrum moderately strongly curved, slender, not widened at antennal insertion ; atennae slender, flavous in the male, fusco-

flavous in the female, the club fusiform, black; elytral striae strong, sharply impressed; legs short, claws not strong, dentate at base beneath.

Head of the male evidently longer than wide, the eyes large and prominent; frons in front as wide as the base of the rostrum, behind much wider, rather strongly but shallowly rugose-punctate, the interstices micro-reticulate, the surface moderately densely clothed with white hair scales; temples very short; beneath the eyes with a moderately dense tuft of longer white hair-scales; head of the female not wider than long, eyes not at all prominent, almost flat; frons as in the male; beneath the eyes with a less prominent tuft of white hair-scales. *Rostrum* of the male slightly shorter than the head and pronotum taken together, of the female as long as or slightly longer than the head and pronotum together, slender, distinctly curved, evidently longer in the female than in the male, barely perceptibly wider at the base, cylindrical; very finely and sparingly punctured, the surface dull, finely reticulate, throughout clothed with recumbent white hair-scales, which are shorter towards the apex; subnitid at the apex in both sexes; ventrally the hairs are sub-erect but very short. *Antennae* inserted very close to the base, much less than the diameter of the eye, slender, comparatively elongate, the scape and funicular segments flavous or fusco-flavous, darker in the female than in the male; scape long, as long as the first three funicular segments in the female but only as long as the first two in the male; the proximal segment of the funicle barely longer than the second segment but twice as wide and about two and one-half times longer than wide; third to seventh segments progressively shorter and broader, seventh almost square; club compact, elongate-oval, widest at middle. *Pronotum* as long as wide at the base, widest basally, the base bisinuate, slightly produced in the scutellar area and the hind angles prominent and sub-acutely produced; the apex one-third narrower than the base, the sides sinuate due to moderate sub-basal and sub-apical constrictions, the general shape roughly conical; surface moderately closely and densely punctured, the interstices about one-half to one-third the diameter of the punctures, more or less obsoletely reticulate; the anterior margin flattened, inpunctate and shining, the normally marginal punctures set back to the length of their hair-scales from the edge; clothing of moderately long white hair-scales set in the punctures, somewhat denser at the sides in the male; the sub-basal ante-scutellar foveole rather obsolete; dorsal outline weakly convex. *Scutellum* small, oval, micro-reticulate. *Elytra* short oval, widest at one-third from the base, basally not wider than the base of the pronotum, the humeri strongly produced and prominent, the sides rounded; the striae shallowly but sharply impressed, catenate-punctate, the interstices of the punctuation as long as the diameter of the punctures and bearing a short,

evenly attenuated acutely pointed white hair-scale ; interstriae flat, one and one-half times wider than the striae, dull, finely transversely strigulate, bearing a unilinear series of fine, lanceolate hair-scales longer than those of the striae ; dorsal outline not very highly convex longitudinally, highest at middle ; the base of the second interstria with a not particularly noticeable tuft of white hair-scales ; apices in the male widely rounded, in the female rounded rectangular. *Venter* with the metasternum and two basal abdominal ventrites distinctly and moderately closely punctured, particularly laterally, the interstices shining and about equal to the diameter of the punctures ; fifth ventrite impunctate, shagrinate ; metasternal episterns and mesosternal epimera more densely clothed with white hair-scales. *Legs* short, posterior femora not quite attaining the apex of the abdomen ; tibiae straight ; anterior and intermediate tibiae, particularly in the male, slightly rufescent ; tarsi short, the fifth segment short, shorter than the basal segment which is almost as long as the second and third segments taken together ; claws short and weak, finely dentate at the base beneath. *Sexual dimorphism* distinct in the larger eyes, the shorter, less slender rostrum, the proportionally shorter antennal scape, the more widely rounded apices of the elytra and the longer and more conspicuous tuft of white hairs beneath the eyes in the male.

Length : 1.31-1.72 mm. (*sine rostro*).

29 specimens as follow : Holotype ♂, Platus, Krios River, 4.vii.1937. — Allotype ♀, same particulars with altitude 4000 feet. — Paratypes, Mt. Troodos, 5500-6000 feet, 21.vi.1937, 1 ♂ ; Mt. Troodos, Mesopotamis, 12.vii.1937, 1 ♂ ; same particulars as allotype, 1 ♀ ; Palacomylos, 10.viii.1937, 1 ♀ ; Pera Pedi, 1.ix.1937, 6 ♀♀ ; same locality, 4.ix.1937, 15 ♀♀ ; Pera Pedi, Krios River, 8-9.ix.1937, 2 ♀♀.

This little species may, perhaps, be the « *atomarium* Kirby var. » of Kotschy's list. It is close to but very much smaller than *vicinum*, having much more prominent eyes in the male, a longer and more slender rostrum in the female and seems readily separable from all the species of the *vicinum* sub-group of *Thymapion*, of which I have seen all the described species. *A. consors* Desbr. which must evidently also be closely related to *bifarium* by the larger eyes of the male is also very like *vicinum* but much smaller, but the eyes of the female are definitely more prominent than in *bifarium*, the rostrum decidedly stouter and the clothing of the meso-epimera and meta-episterna is much thicker and more conspicuous and the interstriae are not wider than the striae, which are also more impressed.

(12)* (*Catapion*) *atomarium* Kirby var. (U.K.).

(13) (*Catapion*) sp. nov. near *corsicum* Desbr. : Curium Ruins, 8.v.1933, 1 ♀ (G.A.M.).

This species is, I think, distinct from those hitherto known but I am not prepared to describe it as new on the unique before me.

(14) (*Catapion*) *pubescens* Kirby: Famagusta, 5.vii.1931, 1 specimen (L.K.).

(15) (*Diplapion*) *confluens* Kirby : Kilani, Krios River, 14.ix.1937. 1 ♀ (G.A.M.)

(16) (*Diplapion*) *detritum* Rey: Ayia Mavi Monastery, 27.viii.1937, 1 ♂ (G.A.M.).

(17)* (*Diplapion*) *stolidum* Germ. (U.K.).

(18)* (*Ceratapion*) *?onopordi* Kirby (U.K.).

(19) (*Ceratapion*) *pilicorne* Desbr.: Akrotiri Forest, 14.v.1933, 2 ♂♂, 3 ♀♀ (G.A.M.); Cherkes, 18.vi.1934, 1 ♀ (G.A.M.); Zakaki, 23.vi.1934, 1 ♂ (G.A.M.); Zakaki Meadow, 3.ix.1937, 1 ♀ (G.A.M.); Pera Pedi, 19.ix.1937, 1 ♂ (G.A.M.); Episcopi, 28.ix.1937, 1 ♀ (G.A.M.); Episcopi, 14.v.1937, 1 ♂ (G.A.M.).

(20)* (*Omphalapion*) *dispar* Germ. (U.K.).

(21)* (*Omphalapion*) *hookeri* Kirby (U.K.).

(22) (*Stenopterapion*) *tenue* Kirby : Episcopi, 4.v.1937, 1 ♂ (G.A.M.).

(23) (*Kalcapion*) *flavofemoratum* var. *croceifemoratum* Gyll. (U.K.) : Mt. Troodos, 21.vi.1937, 2 specimens (G.A.M.); same locality, 1.vii.1937, 2 specimens (G.A.M.).

(24) (*Cnemapion*) *vorax* Herbst.: Mt. Troodos, Krios River, 15.vi.1937, 4 specimens (G.A.M.); Mt. Troodos, 21.vi.1937, 3 specimens (G.A.M.); Mt. Troodos, Mesopotamis, 12.vii.1937, 13 specimens (G.A.M.); Platus, Krios River, 4.vii.1937, 3 specimens (G.A.M.).

(25) (*Holotrichapion*) *ononis* Kirby (U.K.) : Mt. Troodos, 5000-6000 feet, 21.vi.1937, 1 ♀ (G.A.M.); Platus, Krios River, 4.vii.1937, 3 ♂♂ (G.A.M.); Mt. Troodos, Mesopotamis, 12.vii.1937, 3 ♂♂ (G.A.M.).

(26) (*Eutrichapion*) *viciae* Payk. : Mt. Troodos, Krios River, 15.vi. 1937, 1 specimen (G.A.M.); Mt. Troodos, 5000-6000 feet, 21.vi.1937, 1 specimen (G.A.M.); Mt. Troodos, Mesopotamis, 12.vii.1937, 6 specimens (G.A.M.); Pera Pedi, Krios River, 8.ix.1937, 4 specimens (G.A.M.).

(27) (*Neoxystoma*) *ochropus* Germ. : Platus, Krios River, 4000 feet, 4.vii.1937, 1 ♂ (G.A.M.); Mt. Troodos, Mesopotamis, 12.vii.1937, 2 ♂♂ (G.A.M.).

(28)* (*Protapion*) *flavipes* Payk. (U.K.).

(29) (*Protapion*) *nigritarse* Kirby: Pera Pedi, Krios River, 8-10.ix.1937, 3 ♂♂, 7 ♀♀ (G.A.M.); same locality, 1.viii.1937, 1 ♀ (G.A.M.); same locality, 1.ix.1937, 1 ♂ (G.A.M.); same locality, 4.ix.1937, 1 ♂, 1 ♀ (G.A.M.); Ayia Mavi, Krios River, 7.ix.1937, 1 ♂ (G.A.M.); Kilani, Krios River, 11-14.ix.1937, 4 ♂♂, 2 ♀♀ (G.A.M.).

(30) (*Protapion*) *aestivum* Germ. (U.K.) : Akrotiri Forest, 14.v.1933, 1 ♂ (G.A.M.) ; Cherkes, 5.vi.1934, 1 ♀ (G.A.M.).

(31)* (*Protapion*) *ononicola* Bach. (*ononidis* Gyll. [U.K.]).

(32) (*Protapion*) *cyprium* sp. n.

♂, ♀ : Derm black, the anterior coxae and all the trochanters and femora flavous, all tibiae fusco-flavous, the two posterior pairs proximally more or less distinctly with a flavous ring ; tarsi black ; pronotum almost cylindrical, closely punctured, the surface more or less prominently longitudinally rugose ; rostrum almost straight ; anterior and intermediate coxae armed with a blunt tooth ; antennae not sexually dimorphic.

Head as long as wide, the eyes not prominent, flatly rounded ; frons slightly narrower than the base of the rostrum, distinctly but finely longitudinally rugose ; vertex finely and sparsely punctured, microreticulate ; temples finely punctured, narrow ; very finely and sparingly pubescent. *Rostrum* of the male slightly longer than the pronotum, of the female longer, as long as the head and pronotum taken together, cylindrical, very slightly curved, almost straight, basally microreticulate, from the antennal insertion to the apex shining, finely and sparingly punctulate, laterally and ventrally more strongly and distinctly linearly punctulate ; almost glabrous. *Antennae* slender, not very long, inserted in the male at almost half the length of the rostrum from the base, in the female at about two-fifths of the length of the rostrum from the base, rufo-fuscous ; the scape short, in the male barely longer, in the female about one and one-half times longer than the basal segment of the funicle which is barely longer than, but about twice as wide as the second segment ; third to seventh segments progressively shorter and broader, seventh square ; club compact, fusiform, widest at middle. *Pronotum* almost cylindrical, sides very weakly rounded, slightly longer than wide (1.3 :1.1) ; closely and not very strongly punctured, the punctures tending to be slightly elongated and linear, the interstices more or less prominently longitudinally rugose and the punctures lngitudinally somewhat confluent, at least dorsally ; dorsal outline very weakly convex ; sub-basal and sub-apical constrictions obsolete ; very finely, almost invisibly pubescent ; a distinct, deep, elongate sub-basal ante-scutellar foveole reaching almost to the middle of the pronotum. *Scutellum* minute. *Elytra* elliptical, sides weakly rounded, widest at middle ; humeral callus moderately developed but not prominent ; dorsal outline flatly rounded, not highly convex, the posterior declivity moderately steep, highest at middle ; distinctly, sharply but narrowly striate, the striae catenate-punctate, the punctures small and separated by a space about twice their diameters ; first stria uniting with

ninth, second with eighth at apex; interstriae very weakly convex, almost flat, three times (four times at the sides) as wide as the striae, microreticulate and not very shining, very finely and sparingly and apparently irregularly pubescent; apices in the male more widely rounded, in the female rounded restangular. Venter obsoletely microreticulate and sub-nitid on the metasternum which is very finely and sparingly punctulate; first, second and fifth ventrites distinctly microreticulate, dull. *Legs* with the procoxae, all trochanters and femora except the extreme « knee » clear flavous; the tibiae fuscous with a more or less clear proximal flavous ring on the two posterior pairs; taris black, the basal segment short, not as long as the second and third sgements taken together; claws rufo-fuscous, not very strong, distinctly but finely dentate at the base beneath; legs moderately long and slender, hind femora attaining the apex of the abdomen; anterior and intermediate coxae of the male armed with a blunt tooth. *Sexual dimorphism* evident only in the armed anterior and intermediate coxae, the shorter rostrum and more widely rounded fifth ventrite of the male.

Length : 1.64-1.94 mm. (*sine rostro*).

Holotype ♂, Limassol ii.1934. — Allotype ♀; same particulars. — Paratypes : same particulars, 2 ♂♂, 6 ♀♀; same locality, 11.v.1933, 1 ♂; same locality, 26.v.1934, 1 ♂; same locality, 10.v.1934, 3 ♀♀; Episcopi, 28.v.1933, 1 ♂; same locality, 4.v.1937, 1 ♂; Akrotiri Bay, 24-25.xi. 1937, 3 ♂♂.

This little species runs to *angusticolle* Gyll. in Wagner's key (Col. Centrabl., 1, 1926 : 135) but it differs from that species by the much narrower and less deeply impressed elytral striae, the proportionally wider, less reticulate interstriae, the darker tibiae, clearly proximally flavous ringed and straight, the straighter rostrum, the more shining-black, not dull metallic elytra and the sub-equal basal and second segments of the antennal funicle. From *woerzi* Wagn. the species differs by the straight, not curved rostrum, the distinctly rugulose tendency of the pronotal punctuation, the darker antennae, the straight intermediate femora and the obsolete sub-basal and sub-apical pronotal constrictions which are not stronger than those of *angusticolle* Gyll.

Summary Report on the Work of the Third Egyptian Anti-Locust Unit to Arabia

(with 4 Maps)

by Mohamed Hussein,
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INTRODUCTION

For the third time Egypt has participated, during 1943-1944, in the war waged against the Desert Locust (*Schistocerca gregaria* Forskal), in the Arabian Peninsula.

The first mission was sent in 1937 and collected information, also made observations on the movements and behaviour of this pest.

A paper on this subject was read at the Fifth International Locust Conference held in Brussels in 1938 and then published by the Egyptian Ministry of Agriculture (1).

In 1942-43 work assumed an offensive nature. The Saoudi Government cooperated with the British and the Egyptian Anti-Locust Units in the actual destruction of locusts.

An article published in Fouad I[st] Entomological Society's Bulletin briefly illustrated the work of the Egyptian Locust Unit in Arabia during 1942-43 (2).

This is a short account of the third campaign in 1943-44, with an attempt to describe briefly, the main natural features of the fields of operations, observations and information on locust movements and behaviour, technique and methods of control; also the results obtained.

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(1) M. Hussein: An expedition to Arabia for Locust Investigations, *Technical and Scientific Bulletin*, No. 225, Ministry of Agriculture, Cairo, 1939.

(2) Mohamed Hussein: A short account on the propagation and control of the Desert Locust, *Schistocerca gregaria* Forskal, in some parts of Arabia, *Bull. Soc. Fouad I[er] Entom.*, Vol. XXVII, pp. 159-173, 1943.

The Cairo and Teheran Locust Conferences

Soon after the 1942-43 campaign two meetings were arranged during July by the Middle East Supply Centre in Cairo and Teheran, where representatives from many countries of the Middle East and from the Anti-Locust Research Centre of London; also the M.E.S.C. reviewed the whole locust situation, analysed and discussed the results of the previous campaign. Certain resolutions were passed. All agreed that the campaign already begun against locusts in many areas of Asia and Africa, including Arabia, should continue in the coming year with more vigour and with greater efforts as everything indicated the approach of the climax.

Preparation

Early in September 1943, a meeting was held in the Ministry of Agriculture in Cairo presided over by H.E. the Minister and attended by the Chief Locust Officer in the M.E.S.C., representatives from that Centre and from the Egyptian Locust Bureau. Many questions relating to the locust situation in Arabia and Egypt were fully revised and recommendations made.

The areas alloted to both the British and Egyptian Anti-Locust Units to Arabia were defined. The share of the latter included the Hedjaz, Asir and the Yemen.

On this occasion, as in 1942-43, the M.E.S.C. had to arrange for the supply of all necessary vehicles with their tools and spare parts. The Sudan Government was to supply both units with the necessary amount of prepared locust bait against payment.

Practically all other requirements were to be prepared by the concerned governments.

Early November was fixed for the departure of both units from Egypt to the Hedjaz by the land route.

The mobile element of the Egyptian Unit was ready only by the end of December, and on January 3rd 1944 we started the journey from Cairo.

The Main Natural Features of the Peninsula

Before giving further details on the campaign, it would be advisable to describe, very briefly, the most outstanding features of the field of operations.

The idea that Arabia is a flat sandy wilderness hardly coincides with the actual surface of the terrain.

There exist several areas, differing in formation and structure.

A continuous chain of mountains runs from Akaba to the Yemen, getting closer and higher towards the South.

The distance between these elevations and the Red Sea is of limited width, while to the East lies a vast desert.

Heavy rain falls on these highlands, forming streams running to the Sea. The name Wadi, meaning valley, is given to these water courses.

In the coastal area, the rainy season extends from Autumn to early Spring, but the amount varies and during certain years is limited. Dry seasons are frequent bringing in their trail famine and misery.

The Bedwins depend on rain coming to the mountainous regions from Spring to Autumn, especially in Asir and the Yemen, which fall within the limits of a monsoon belt.

Te Hedjaz is the name applied to the coastal area from Akaba to Jedda, including the holy cities of Medina and Mecca as well as the old famed oasis of Taif.

The stretch of land bordering on the Red Sea, South of Jedda, in both Asir and the Yemen is called the Tehama.

The Nefud lies to the North of the Peninsula and is bounded by Transjordan and the Iraq.

Hail, the capital, is the commercial centre of this part of Arabia and is known for its sandy elevations and the many scattered oases. There are abundant artesian wells mostly situated in depressions.

South of that, we find the Dahana desert with Bureida and Aneiza, the centres of old famous tribes. El Hasa, noted for its palm groves lies to the East. Then comes Al Riad, the capital of Nejd.

El Rob el Khali, meaning the empty quarter, is situated to the East of Asir and to the North of Yemen and Hadramut. Very little is known of the fauna and flora of this vast area.

This variation in geographical situation and in the natural formation of Arabia has had a pronounced effect on the prosperity of the inhabitants.

While the name *Arabia Deserta* is applied to the northern semi-arid regions, the Asir and the Yemen are called *Arabia Felix*, meaning prosperous and happy. This part was well renowned since olden days for its mild climate, abundance of water and agricultural wealth.

The Journey

As aforementioned, we left Cairo on January 3rd 1944, in a caravan of forty vehicles, and reached Akaba via Sinai two days later.

On the 6th I proceeded to Haikl, the first Saoudi port, about thirty miles to the South, near the coast.

The Amir, i.e. the Governor, thought it necessary to communicate with the central government before proceeding any further, and this delayed our departure to January 15th.

We followed the coast route down to Yanbo. Salt pans and muddy areas, after recent heavy rains, delayed our march somehow. On the whole, this track, as we heard later, proved to be easier than the inland route, taken by the British Unit which travelled late in November 1943 via Tebuk, Ula and Medina.

After Haikl, we turned about 15-20 miles eastwards before taking a southerly route to Khereiba at the southern end of Akaba Gulf.

In many places the mountains stood close to the shore, leaving hardly any passage even for a vehicle.

Except for two sandy valleys, namely Afal and Sheaib, this part of the country was rocky.

From Kheraiba to Dhaba, Wejh and Umm Lajj, we hardly lost sight of the sea. On more than one occasion, one or more truck stuck in the heavy sand.

Just before and after the small village of Umm Lajj, a long sandy stretch of land followed by a salt pan was encountered.

About ten miles before Yanbo el Bahr we turned to the East and followed a route near the highlands in order to avoid many flooded areas.

On January 27th we arrived at the small harbour of Yanbo having thus accomplished a journey of nearly 800 miles in twelve days.

News on Locusts Breeding and Movements

(a) *From Akaba to Yanbo el Bahr:*

Until Dhaba, we neither heard nor observed any locusts. Here rumours came of swarms appearing lately in some localities to the South-East.

At Wejh similar news was confirmed by the Amir and on January 23rd he joined me in a tour to suspected areas. We found scattered red and yellow *Schistocerca*. In all probability they were the remnants of swarms. The Bedwins living in the vicinity reported the recent arrival of such invaders from the West and the South-West, which, after a short rest, disappeared in the mountains to the East.

Between Wejh, Umm Lajj and Yanbo el Bahr few mature locusts were met with. Fishermen and some of the inhabitants had observed big numbers of dead locusts washed up by the waves.

The same day we arrived at Yanbo, the Amir informed me of heavy hopper infestations in many areas to the East. These were the progeny of big swarms which arrived in these localities from late November onwards.

Owners of palm groves and farmers of Yanbo el Nakhl (a rich agricultural district about 25 miles to the East), were alarmed.

Arrangements were made for immediate scouting and control.

(b) *From Yanbo el Bahr to Jedda:*

On my way to Jedda on January 31st I found few sexually mature and immature desert locusts, but they became more numerous South of Rabigh near Towal and Dahban 80, 50 and 30 miles respectively North of Jedda.

There were widespread rumours of heavy locust infestations in many areas around Medina and to the East and North-East of Jedda.

(c) *South of Jedda:*

The Locust situation in the Tehama of Asir, was described as very serious. Dense swarms were coming from the West and the South-West and had started to invade this region from November 1943 onwards; and breeding, after heavy rains and torrents, was on an extensive scale.

Programme of Work

I went to Jedda, mainly to discuss with the Saoudi authorities and the British Locust Unit, the final programme of the campaign.

Together with Abdul Hamid Munir Bey, the Egyptian Chargé d'Affaires, I met Sheikh Yousef Yasin, private Secretary to H.M. King Ibn Saoud.

After discussing many points, it was decided to send our brigades to the selected posts. Each group working in adjacent areas having a guide from the Government to help in supplying workmen, local guides, etc..

Owing to the late arrival of our Unit, and the early hopper infestations in some areas North of Jedda, which fall within the scope of our belt, it was decided to release the brigades of the British Unit (already occupied in this work) and replace them by Egyptian parties.

Major Hodder of the British Unit was, by now, dealing with the serious hopper outbreak round Qizan, near the Yemen boundary. Many areas in the Tehama of Asir were in flood after heavy rain and torrents. Some of the trucks sent from Jedda carrying equipment could not reach their destination.

It was decided therefore to examine the road from Jedda to Qizan before sending out brigades from the Egyptian Unit. Captain Tice of the same Unit after examining the road by plane reported that although some of the salt pans had dried up, vehicles proceeding to that area should carry only 1/3 of their original load.

On February 15th four of our brigades with 12 vehicles left Jedda for the South. Their bait, petrol and other necessary equipment were sent by dhow to Qunfidha and Qizan, the two main centres.

Major Hodder returned from Qizan on February 20th, and four days later I left Jedda by plane for Qizan. After a short stay at Qunfidha where arrangements were made for the control of hoppers in many localities

in the vicinity, I then proceeded to Qizan. Our trucks had already arrived there the same day.

Zones of Locusts Breeding and Movements in Arabia

In a previous attempt (3) I divided this Peninsula into three zones as regards locusts activity :

(A) The western region within which scope falls the Red Sea littoral in both Africa and Asia. From Autumn the Summer generation produced in some territories of East Equatorial Africa begins migration to the East and the North-East. In many instances part of even the majority cross the Red Sea to Arabia.

(B) The eastern zone comprises Oman, Hasa and other neighbouring localities. This area is strongly correlated with the Indo-Persian Sector. Last Autumn and Winter Arabia was hardly invaded from this source. On the contrary the Spring generation produced in western Arabia reached the eastern Sector.

(C) The Third section includes southern Yemen, Aden and Hadramut and is affected by locust propagation in the Somalis and other areas in the vicinity. Occasionally swarms of the Spring generation produced in South-West and Middle Arabia reach this zone late in Spring or early Summer and remain to prapagate.

The Locust situation in Western Arabia from Autumn 1943 until early Summer 1944

I have already referred to observations and information collected on our way to Hedjaz during January 1944 and later from Asir and Yemen.

These, when analysed, permit making the following deductions :

(1) During Summer 1943 locusts bred extensively in the Sudan, Eritrea, Abbysinia and some other areas.

(2) From November 1943 until January there began a wave of locusts migration from these inland territories to the North, the East and the North-East. As a cosequence the coastal regions in both Eritrea and the Sudan became infested with locusts.

(3) In November 1943 few swarms appeared in the south-eastern of Egypt. News also came of locusts invading the Tehama of Asir and Hedjaz.

(4) We knew nothing of the locust situation in the Yemen until we visited that country in March 1944. The main object of this trip was to collect information and make arrangements for anti-locust work in the future. I found and came to learn that the locust situation hardly differed from Asir and Hedjaz. Swarms invaded the coastal area here from November 1943. The

(3) *Bull. Soc. Fouad I^er Entom.*, Vol. XXVII, 1943.

majority remained and bred in many localities of the Tehama North (latitude 15° 15'), the area South of that limit being arid.

(5) In the previous Summer no locusts were found breeding within the Egyptian boundaries. Nobody reported such an incidence from the coastal belt in western Arabia.

Accordingly the majority, if not all the invading swarms, must have originated in Africa and represented the Summer generation produced then.

(6) The drowned locusts found near the coast of Dhaba, Wejd and Ummlajj as well as the swarms which reached some of the localities to the East, together with the few red *Schistocerca* observed early in December 1943 near Tebuk (lat. 28° 25', long. 36° 50'), had in all probability come from the Sudan via the south eastern desert of Egypt.

(7) Many areas of the coastal region in western Arabia had received exceptional heavy rains during Autumn 1943.

(8) Although locusts invading this belt at about this time, represented the same Summer generation produced in Africa, yet their stage of growth varied much. While some were either sexually mature or about to reach of this age, the rest were still red, an indication of immaturity.

(9) The former swarms either settled to propagate in many of the coastal areas or roamed about for a short time before starting this process. The red fliers on the other hand continued their journey inland until they reached, late in January, the Dahana, Buraida and the Nefud in the middle and the North-East of the Peninsula. Here they settled and continued to breed from early February until March 1944.

(10) Early in February 1944 another wave of mature swarms coming from the East and the North-East appeared East of Medina, round the city itself, at Yanbo, Ries (on the coast about 60 miles South of Yanbo), and North of Jedda. These again belonged to the late Summer generation.

Late the same month also in March, rain fell on these areas and early in March we started dealing with their offspring which represented also hoppers of the first Spring generation.

(11) Late in February and early March 1944, locusts of the first Spring generation which escaped destruction in the Tahama of Asir, or were not dealt with in the North coastal areas of the Yemen, began to form swarms. They soon began invading many of the mountainous localities to the East and the North-East. Some remained in the Asir, Taif and Asbaira areas, the rest reached late in March as far as Dehana and Riyadh and even crossed the Persian Gulf to Iran and India.

(12) Early in May 1944 many areas in Asir, Tehama, Taif, Ashaira and the country round about received abundant rain. Hoppers representing the

second Spring generation hatched. These were dealt with until early June just before our return journey to Egypt.

(13) Late in May immature swarms coming from the East appeared at Medina, Yanbo and Ummlajj. They were part of the locusts which escaped destruction in the Medina and Hanakiya areas.

Some Metereological Data

The following informations and observations on rainfall and sudden weather changes in some parts of Arabia, although fragmentary might prove useful

Rainfall

November and December 1943 : Heavy rain and torrents at North Tehama of Yemen, the Asir and its Tehama, practically all Hedjaz and some inland regions.

13th, 17th, 22nd and 23rd January 1944 : Showers and heavy rain East Arabia, Dhaba, Wejh and Ummlajj.

9th, 11th, and 27th February 1944 : Showers at Yambo El-Nakhl, Medina, Rias and Jedda.

3rd, 4th, 8th, 11th, 12th, 22nd, 24th and 26th March 1944 : Heavy rain at Yambo El-Nakhl, Medina, Masagid Rais, Mecca, North Jedda, some areas in Middle and East Arabia.

17th to 19th, 21st, 23rd and 29th April 1944 : Heavy rain and torrents at Medina, Wejh, Rabigh, Wadi Fatma, Mecca, Qunfidha-Jedda, North Jedda, North and East Arabia.

5th, 18th and 22nd May 1944 : Heavy rain at Taif, Jedda-Mecca area, near Medina and Middle Arabia.

Wind

Generally speaking in Winter and early Spring a strong northerly or north-westerly wind begins blowing near the coast just before noon and abaits late in the evening.

From April an easterly wind loaded with dust prevails. The following weather changes were noted :

2nd to 3rd February 1944 : Strong northerly wind at Yanbo El-Nakhl.

22nd to 23rd February 1944 : Strong north-westerly wind at Yanbo El-Nakhl.

22nd and 23rd March 1944 : Strong dust storm from East of Jedda.

27th to 30th March 1944 : Strong northerly wind at Jedda.

31st March to 1st April 1944 : Sand storm from East at Yanbo El-Nakhl.

1st April 1944 : Clouds and thunder, strong wind from East at Qizan.

9th to 10th April 1944 : Strong northerly wind at Yanbo El-Bahr.

7th, 11th, 23rd and 29th May 1944 : Strong easterly wind at Yanbo El-Bahr and Jedda.

2nd, 9th and 11th June 1944 : Strong dust storm from East at Jedda.

Hopper infested areas in Western Arabia from January to June 1944

(1) Yanbo area

Although few stragglers of adult locusts were present in some areas North of Yanbo, no hoppers were observed on our way to Hedjaz in January 1944 nor in later dates.

On arrival at Yanbo el Bahr, on January 27th, we immediately started to scout and combat hoppers in many neighbouring localities, the terrain of which varied greatly.

To the East of Yanbo el Bahr lies a flat sandy area scattered with acacias. This is followed by a chain of sandy hillets leading to the depression of Yanbo el Nakhl (*Nakhl* meaning palm tree). This infested area extended another 15 miles to the East and the North-East of the hillets, being interspersed with many wide valleys, which receive the torrents formed by rain falling on the many mountains scattered in this locality, and which finally feed this oasis.

Heavy rain fell on this area last Autumn providing suitable moisture for locust breeding and ample food for the hoppers. Hatching was observed from late January and continued until about February 20th.

Judged by the density of emerging hoppers, the invading swarms must have been dense and egg-laying on the whole concentrated.

Early in the morning (no exact hour can be given, this as will be referred to later depends upon climatic conditions), newly emerging hoppers left the plants on which they spent the night and congregated in patches. In some cases they took shelter by the side of a big rock to be protected from strong blowing winds. In cool weather they faced the sun.

In hilly sandy localities hoppers poured, in a limited front of few metres, to the level ground below.

Practically the same conditions prevailed in the many tributaries of the valleys surrounded by mountains. The hoppers on some occasions ascended these slopes and spent the night on the plants or even in the openings between adjacant rocks.

The few mature swarms which arrived to this area from the East early in February 1944, and which represented the late Summer monsoon generation also oviposited in big concentrations. In some cases the females were observed laying two egg-masses at five days interval.

The hatching of eggs laid by the earlier swarms, of November and December 1943, covered a period of about one month. This may be also due to more than one egg-mass being laid by the same female.

Rain falling late in February and early March not only stimulated the hatching process, but also kept the tiny desert shrubs green for a long period.

(2) Rais-Medina area

In the Rais area, as well as in many infested localities between Yanbo el Bahr and Medina, the hoppers had, by the time our brigades undertook work here about the middle of February, reached the third and even the fourth instars.

The former locality is, on the whole, sandy with many acacias and some scattered cultivated patches of Dokhn (*Holcus dochna*, Forsk.).

Hoppers had by now formed thick bands and attacked these cultivations. Usually they spent the night on and under the plants or remained hidden in the thorny hedges.

Except for the first 50 miles or so East of Yanbo el Nakhl the rest of the area is rocky. During late January hoppers were found in many small inaccessible wadis lying on both sides of the Medina road.

When the campaign was finally organised here, about the middle of February, many of these scattered hopper groups had formed bands and made for the open level ground adjoining the road. Hoppers of the late swarms, which invaded both Rais and Medina areas early in February, gathered in fairly large patches and were dealt with before forming marching bands.

(3) Jedda-Mecca area

During January and February 1944, many localities to the East and North-East of Jedda were found infested with hoppers.

The distance of about 40 miles from the coast to Mecca is flat sand. The city of Mecca itself is encircled by a chain of mountains extending to the East and North.

Autumn rains provided the soil with moisture necessary for the growth of luxuriant vegetation and the propagation of swarms of 1943 monsoon generation.

About the middle of February, scattered but dense hopper bands were discovered in many localities of this area including Wadi Fatma where many vegetables are grown.

In the area North-East of Jedda hopper infestations began from Braiman well, about 15 miles to the North-East of Jedda, continuing to the village of Asfan, another 15 miles further North. Both localities lie near

the road leading to Mehd mines and are on the whole rocky in constitution with many small sandy valleys where acacias and clumps of perennial desert plants (*Panicum* spp., *Lycium arabicum* Schw., etc.), grew extensively. These mountains protected the setting swarms from sudden weather changes.

By the middle of February hoppers formed bands and attacked many Dokhn and water-melon cultivations.

Part of the mature swarms, which came from the North-East early in February, settled and propagated in two other coastal areas, Dahban and Towal, 30 and 50 miles North of Jedda. Rain fell on these localities in February and early March. From the middle of March hoppers began to emerge forming clusters.

Water-melon is grown extensively in both Dahban and Towal, fetching high prices at Jedda. The cultivators were greatly alarmed, but the hoppers were dealt with soon after hatching.

(4) Mecca-Taif area

Few swarms appeared in this area during Autumn 1943 and early next January. No breeding was however observed until May 1944.

After Mecca few sandy areas are encountered, followed by a continuous chain of mountains until Taif oasis (1500 feet above sea level).

Late in May, while on a reconnaissance to this area, few hopper groups were unexpectedly found at Sail about 50 miles East of Mecca on the road to Taif.

As already mentioned part of the swarms from the first spring generation, in uncontrolled areas of the Tehamas, began migrating from March towards the East and the North-East.

Some remained to breed in the Taif area, the rest continued migration to Nejd and even further East.

Heavy rain in May over many inland areas including Taif provided suitable soil and abundant food for the swarms and their off-spring.

Very dense hopper groups were discovered late in May and early June in many wadis near Sail and Taif. News also came to the Amir that the situation at Ashaira and some other inland localities was serious.

In some cases hoppers formed marching bands and came from the valleys threatening wheat and barley fields as well as orchards at Taif.

(5) Asir and its Tehama

South of Jedda our brigades arrived at Kunfuda and Qizan, in the Tehama, late in February.

Work in Jedda-Lith area was entrusted to the British Unit.

A vast agricultural area extends from Kunfuda covering nearly all the

coastal belt of both Tehamas in Asir and Yemen, and running to the Eastern highlands.

Although the soil in this area is sandy in texture yet torrents coming practically annually from the mountains bring slit and other ingredients which add to the soil fertility.

Several varieties of Dokhn are extensively grown here practically all the year round. Except in the area South of Loheiyah in Yemen both Tehamas had received ample rain and torrents during Autumn 1943. Consequently the very large swarms, which invaded this zone at about the same time, found suitable conditions for extensive breeding.

As already mentioned Major H o d d e r of the British Unit carried out a successful campaign at Qizan from the middle of January until mid-February. Although a big percentage of hoppers was destroyed by baiting in some villages round Qizan, many other infested areas could not be dealt with. By the time our brigades arrived at Kunfuda and Qizan late in February, the hoppers which escaped destruction had already reached the fourth and the fifth instars and even 30% of the locust population had become fliers. Few hopper groups in earlier stages were also observed.

Here again a variation in the age of hoppers was noted. This may be attributed to the Autumn invasion by both immature and mature swarms, the laying of more than one egg-pod by the same female, or to both factors.

During March and April many of the swarms produced from the first Spring generation invaded the mountainous region of Asir. As already mentioned Taif, Nejd and other areas further to the East were also affected.

The few swarms which remained roaming about in the Tehama were observed propagating here from the middle of May. Torrents and heavy rain during this month over all this area helped propagation and another generation was produced early in June.

(6) T h e Y e m e n a n d i t s T e h a m a

Early in March 1944 practically the same conditions were observed in the northern Tehama of Yemen. About 50 % of the hoppers had undergone the last moult and even the formation of swarms was noticed. When we arrived at Sanna on March 18th news came that higher Yemen was invaded by big red swarms coming from the lowlands bordering the coast.

On our way back from this country late in March we followed the coast route to Asir but observed no locusts breeding in its Tehamas.

Control Measures and Discussion

Locust control in Western Arabia was mainly based on the destruction of hoppers by the poisoned bait.

In a few cases when bait was not available, other methods, referred to later, were employed.

(A) The poisoned bait

(1) Composition

As previously arranged, the Entomological Department of the Sudan Government prepared and despatched the bait to all locust units operating in Arabia from 1942-44.

Its formula is : Sodium arsenite 2.5 lbs. ; water 2.5 litres ; molasses 4.5 litres.

The concentrated solution is diluted in the ratio of 1 : 15 to 17. One litre of this dilution is sufficient to moisten about 0.9 lbs. of wheat bran

The arsenite should contain no less than 80 % water soluble arsenious oxide $AS_2 O_3$.

The dose, used by different countries for the control of locusts and grasshoppers, varies from 1 to 4 percent of the bran weight or any similar carrier.

High percentages are not only dangerous to domestic animals and human beings, but also mean a waste of poison.

(2) Bran

Except in a few cases the size of bran particles, in all bait consignments, were either too large requiring more water on moistening, or too small to form lumps.

Laboratory tests showed that wheat bran 75 % of which particles pass from a mesh of one square millimetre was the best.

(3) Molasses

Experiments carried out in Egypt from 1938-40 with both the Desert Locust and the grasshopper *Euprepocnemis plorans* Charp. have definitely shown that sugar molasses added to bran bait did not act as attractant.

Mr. Maxwell Darling, the former Chief Locust Officer attached to the Middle East Supply Centre, in one of his reports, referred to the good results obtained, during 1942-43 campaign in Eastern Arabia, with bran bait containing no molasses. We noticed the same effect on two occasions in the western Area.

If field tests, in countries still using molasses, give similar results molasses could then be given up.

(4) Moistening the bait

In Arabia the Egyptian Locust Unit followed the following process :

Hopper infested area were inspected, late in the afternoon, for the object off estimating acreage and the required amount of bait. Plant distribution and localities where hoppers were expected to spend the night were also taken into consideration. The quantity of bait to be moistened made into heaps. Water was gradually added and the bait stirred until the liquid reached the underlayers and no lumps formed.

Where tarpauline, or other waterproof material, was available, all necessary water was added. Where mixing was on mats, or on the ground, only half the water was used in the evening, and the rest added early next morning, to avoid any leakage of the poisoned solution.

Moistening small quantities of bait in a four-gallon tin, or other similar containers just before spreading the bait, requires more labourers and supervisors. Even then there is a chance to leave some dry bait.

As regards the quality and quantity of water applied, it was found that any type of well, and even sea water, will do. The amount to be added depends on the size of bran particles.

Experimental work in Egypt showed that wheat bran. with specifications already referred to, requires about one and a half time its weight of water.

The bait was sent to Arabia in small bags of calico, 6-8 of which were put in a canvas sack.

To avoid unnecessary expenses or any loss, double sacks or bags of an inferior quality can be used.

(5) When and where bait was applied

No exact hour can be fixed for broadcasting the bait. Climatic conditions, the kind of flora and its distribution in any area, as well as the daily behaviour of locusts or grasshoppers play an important role.

Results of research work carried out during 1935-36 in the Locust Laboratory of the Anti-Locust Research Centre in London, as proposed and guided by Dr. Uvarov, defined the various activity stages from cold to heat stupor and their ranges in *Schistocerca* (4).

Normal activity in the different nymphal instars falls within 77.99° F (23.9-37.2° C). Here the hoppers manifest all outside movements and behaviour in a normal manner. If air temperature is lowered or raised, activity either decreases or increases. It has been found by actual observations in

(4) M. Hussein: The effect of temperature on locust activity (with a preface by B. P. Uvarov), Technical and Scientific Service, Bulletin N° 184, Ministry of Agriculture, Egypt.

the coastal belt of Western Arabia that *Schistocerca* hoppers behaved normally in air temperatures from 68-98,6° F (20-37° C), with optimum 71,6-93,2° F (22-34° C) and on condition that no strong winds blew and no dense clouds covered the sky.

Such climatic conditions were generally prevalent in this area in the early mornings, from late January to mid March, the peak of hopper emergence period.

Bait was therefore applied in the early hours of the day.

On cold mornings the process was delayed and sometimes even stopped. If, on the other hand, air temperature exceeded the upper limit, baiting was practiced soon after dawn.

In cold windy days, the hoppers remained hidden sheltering in the plants. In this case bait was scattered on and in the plants.

If a strong somoom happened to blow while the hoppers traversed a barren area, they stood in rows each individual holding to the one in front. On some occasions bait was scattered before sunset in and between the plants. Results were satisfactory, especially if the night was not windy, evaporating the water content of bait, and air humidity high. When showers of rain fell, bait, from previous application, regained its attractiveness. Scattered bait remained effective as long as it was neither washed by heavy rain and torrents nor covered by sand.

In hot weather, marching hoppers did not stop to feed upon the bait. They just nibbled the more juicy plants and wet bait through thirst.

Laying a thick belt of bait in the path of hopper bands is risky as it may be carried by heavy rain or torrents or washed away to wells or eaten by animals. Moreover, the upper layer of the bait dries up in a relatively short time, losing its attractiveness.

Bait used in a semi barren area, with scattered perennial plants, gave better results that in localities green with various annual desert plants or cultivations. In the latter case more than one application was necessary.

(6) The quantity of bait used

Estimations varying from 10 to 60 pounds of poisoned bait per acre were advocated. The degree of infestation and the natural features of the area should be considered. It was definitely found that thin spreading gave good results, the hoppers having a better chance to come across the bait.

Labourers are inclined to use excessive quantities of this material either through ignorance or simply to get rid of their share.

As a precaution we used to appoint guards for a period not exceeding one week to prevent shepherds from grazing their animals in any treated area.

(7) Baiting adult locusts

The inhabitants of Arabia and of some other countries eat both hoppers and adults preferring sexually mature females. These are boiled, fried or roasted.

Poisoned hoppers usually die after a few hours to one or two days near the treated areas, according to their age, state of health, etc.

Adults, on the other hand, usually die after 2-3 days. They often migrate from the treated locality to other areas. The bedwins find them a good and easy chase.

It was decided therefore not to use the poisoned bait for combatting flying swarms in Western Arabia.

With newly emerging adults the situation differs. Bait was used without any fatal consequences to human beings.

To this, I referred in my note on the work of the Egyptian Anti-Locust Unit to Arabia in 1942-43.

Soon before the last moult hoppers congregated under and on the trees or on fairly high plants. They were generally in the 4th and 5th instars. One to two weeks elapsed before the whole group attained the flying stage.

During this period, hoppers as well as newly emerging adults fed upon the plants and on desert shrubs near by. They never formed marching bands nor could be persuaded to leave their shelter. Bait scattered under and near the plants was readily devoured. Very good results were obtained especially where such concentrations were big and the locality poor in vegetation. Owing to the relatively long period covered by all hoppers to moult and adults to emerge bait was applied more than once.

(8) Results of baiting

Compared with other chemical and mechanical methods of locust control, the poisoned bait can still be regarded as the easiest, cheapest and most efficient.

In Arabia, we demonstrated by general application its advatages in cultivated areas.

The relatively limited campaign of 1942-43 paved the way for the next seasons' task.

Fortunately no mishap occurred at this early stage.

As a consequence, the people not only approved the system followed, but on many occasions, and especially in cultivated areas, showed great zeal and cooperated with our men.

When we reached Yemen early in March 1944 coming from Saoudi Arabia, we found that the inhabitants of Northern Tehama where locusts had already devastated the cultivation had the same feeling.

The amount of poisoned bait used by the Egyptian Anti-Locust Unit from early February until early June 1944 reached nearly 290 tons distributed over the following areas in both Hedjaz and Asir.

Yanbo el Nakhl, 1911 ; Ewais, Abtah and Khemal wadies, 830 ; Badr and Rias, 1049 ; Shofaiah, 247 ; Masagid, 633 ; Bir Aly, 1661 ; Towal, 1235 ; Dahban, 2235 ; Braiman, Um Hablain and Bahrah, 104 ; Sail and Taif, 827 ; Kunfudah, 330 ; and Gizan, 544. — Total 11606 sacks weighing from 25 to 30 kilogrammes each.

No more bait was available to meet the unexpected hopper outbreak at both Sail ad Taif areas late in May.

If there exists any danger to human beings, through the application of bait, it is confined to flying swarms which as already mentioned were not controlled by this material in Western Arabia.

The Locust Research Sub-Section, together with Department of Forensic Medicine of the Egyptian Government, started last summer some experiments, to estimate quantitatively the actual amount of arsenious oxide HG_2S_3 remaining in *Schistocerca* hoppers and adults after boiling and roasting.

Preliminary results obtained so far show that :

(a) A weight of 100 grammes of second instar hoppers retain after roasting five milligrammes of arsenious oxide. The lethal dose for human beings is estimated at 130 milligrammes. This quantity of the poisonous ingredient is therefore in 2.6 kilogrammes or in 73 thousand hoppers.

(b) A weight of 100 grammes of fifth instar hoppers retain after roasting 11.9 milligrammes of arsenious oxide. The lethal as just mentioned is 130 milligrammes which amount could be traced in 1.176 kilogrammes or in about eleven thousand fifth instar nymphs.

Work on this complicated problem will continue immediately when material allows.

Bait gave the best results when applied for the control of first and second instar hoppers. With older hoppers it required more of the bait necessitating more labour and trouble while the operation was on the whole less successful.

On the other hand, the process was not applied just after hopper emergence in any area as more nymphs generally appeared and bait had to be applied more than once.

The first indication of successful baiting is the dispersal of hoppers and the non formation of marching bands. The disappearance of the black of yellow patterns characteristic to migratory nymphs and taking the colour of their entry into the solitary form.

Results of locust control in any area could be best defined under the

three categories : good, medium, and bad. Calculations represented in figures and percentages are complicated and not safe.

(B) Other methods of control

When we ran short of bait the following control methods were applied :

(1) Trenching

The bedwins, and specially those who practice agriculture, know how to perform this process, which we applied at Yanbo el Nakhl, Medina, Dahban (North of Jedda) and in the Nefud during 1942-43.

Length of trenches rarely exceeded 20-30 metres and the depth from 75-100 cms. The bands were driven towards the trench slowly, otherwise they became excited, changed their direction of march and even stopped.

It was within the range of the normal activity stage, that hoppers from second instar began to form marching groups. Cold and hot winds greatly interfered in this particular behaviour.

(2) Spraying

In 1942-43 carbolic and kerosene soap emulsions as well as solar — a mineral oil— were applied, by locally made hand-sprayers. The first two components soon broke, while solar proved to be very effective in killing hoppers and adults. It was again tried in the following campaign, when a good make of sprayers were used and good results obtained.

Any material used in spraying was applied either late in the evening or early in the morning. The upkeep of any apparatus used was the main difficulty met with, other than the need for more labourers and a thorough system for supervision.

(3) Burning

Except in few cases during 1942-43 locust season, when bushes densely covered with hoppers were burnt at night, this method was not applied in the following year and no flame-throwers used in Arabia.

(4) Natural enemies

Late in May fly maggots were found in the body of some red *Schistocerca* swarms which came from the East to both Jedda and Yanbo. Degree of infestation was high and although the swarms continued their flight westwards and were actually observed crossing the sea, a fairly large number of dead locusts were discovered near the shore.

Exchange of News

As decided in the Cairo Locust Conference of 1944, short fortnightly telegraphic reports were sent by the Egyptian Anti-Locust Unit to the Locust

Centre in London, the Middle-East Supply Centre in Cairo, the Chief Plant Protection Officer in Jerusalem, and the Chief of the Entomological Department in the Sudan.

Detailed weekly reports were also sent to the Locust Bureau of the Ministry of Agriculture in Cairo.

The following wires as exchanged describe in brief the locust situation and progress of work in the areas where the Egyptian Anti-Locust Unit operated from January to June 1944.

From Yanbo February 2nd 1944 : Left Hagil January sixteenth followed coastal route to Wejh stop indications of breednig to the east stop reached Yanbo twentyseventh deuse hopper infestations east and north-east started baiting stop arranging work in other areas.

From Jedda February 4th 1944 : Large mature swarms from south discovered breeding forty miles east Yanbo el Nakhl more hopper infested areas round Yanbo and Medina road.

From Jedda February 15th 1944 : A detailed report was sent on the work of the Egyptian Anti-Locust Unit from January 15th to February 15th 1944.

From Gizan March 3rd 1944 : Locust infestation covers many localities at Kunfuda and Gizan stop swarm formation from early breeding observed stop hoppers of late breeding in last stages now and are being controlled noticeable damage to crops stop proceeding Yemen fifth March.

From Sanaa March 12th 1944 : Inspected coastal and inland regions reached Sanaa sixteenth extensive breeding north latitude fifteen fifteen swarms formed now expect reach Gizan late March.

From Jedda April 4th 1944 : Left Gizan for Yemen March fifth inspected coastal plains to Mokha boundary and many regions to Sanaa returned Gizan March twentyninth and Jedda April second stop extensive breeding from coast to eastern highlands north latitude fifteen fifteen crops much damaged swarms formed fly to east and south-east and reported from many mountainous areas stop resultant generation from Tehama areas south of Jeddah to Gizan which escaped destruction invaded many localities in Asir stop north Jedda old and recent hatching in many areas showers of rain during March control work continued.

From Jedda April 14th 1944 : Inspected Ras to Medina Yanbo el Bahr Yanbo el Nakhl Medina and Jedda areas stop first three localities clear from locusts after successful campaign stop advanced hoppers east Medina and newly emerging hoppers after March rain in many localities from thirty to seventy miles north Jedda and near coast both originating most probably from East and their offfspring are being controlled scouting continued.

From Jedda May 5th 1944 : Operations against advanced scattered hopper bands and fliers in many areas thirty to sixty miles north Jedda

continue successfully stop scouting Abha region latitude 18-18 50 longitude 42 20 - 42 50 still going on but results so far negative stop small red swarms lately appeared Medina area coming from east stop Palestine, Egypt and Sudan may be invaded from late May.

From Jedda May 19th 1944 : Campaign near coast thirty to sixty miles north Jedda concluded May fiffteenth stop baiting and spraying applied stop inspected recently areas north Jedda to Medina and Yanbo stop Red swarms medium size coming from East observed near Medina Yanbo and Um Lejj stop our gangs at Asir recently report news of breeding on a small scale during March and April stop the fliers as well as invaders from the coastal plains of Tehama show tendency of movement to West and South West.

From Jedda May 29th 1944 : Newly emerging hoppers discovered in many scattered areas from Sail seventy kilos east Mecca to Taif stop news came of more infestations to the East stop control started as far as our resources permit.

SUMMARY

(1) The Egyptian Anti-Locust Unit left Cairo via Sinai on January 3rd 1944, reached Akaba on the fifth, departed from Hagil the first Saoudi port on the 17th and reached Yanbo el Bahr on the 28th.

(2) No locusts were observed or reported North of Akaba. To this until Yanbo news came of swarms which came a month or so before from the West and the South-West with great numbers of dead locusts washed by the waves.

(3) On arrival at Yanbo news keeping of breeding in some areas to the East and the North-East. Inspection revealed more infestations with newly emerging hoppers.

(4) Same conditions and even worse were reported or observed in many other localities of the Red Sea littoral down to the Yemen boundaries and inland to Medina, Mecca and Taif.

(5) Practically all the invading swarms originated from Africa extended from North Yemen to North Hedjaz and inland to Nejd and the Nefud.

(6) The first Spring generation began appearing from December 1943 and continued until March 1944.

(7) Those which escaped destruction formed swarms and began from early March invading the mountainous region in Yemen, Asir and even the eastern Sector.

(8) Another Spring generation began to appear in some of those areas late in May.

(9) The poisoned bran bait was practically the only method applied for

the destruction of hoppers. When we ran short trenching and spraying were resorted to. Flying swarms were not combatted being eaten by the inhabitants but bait was applied for killing newly emerging adults with promising results.

Some observations were made regarding the properties of ingredients used in the bait, its formula, time of application, etc.

(10) About 300 tons of the bait were used by the Egyptian Anti-Locust Unit in Arabia from early February to early June 1944 without any mishap to man or animal.

(11) The people came to realise the efficiency of this material and the benefits of locust control.

(12) Nearly twenty-two thousand local paid labourers were employed by the Unit during this period.

(13) On June the 11th both the British and Egyptian Anti-Locust Units returned from Arabia to Egypt following the same coastal route to Hagil, Sinai, and reached Cairo on the 29th.

ACKNOWLEDGMENT

The locust control 1943-44 campaign in Arabia is indebted in its achievements to the spirit of cooperation and great help given by the different individuals and authorities especially the governors and officials of the Governments of Saoudi Arabia and Yemen.

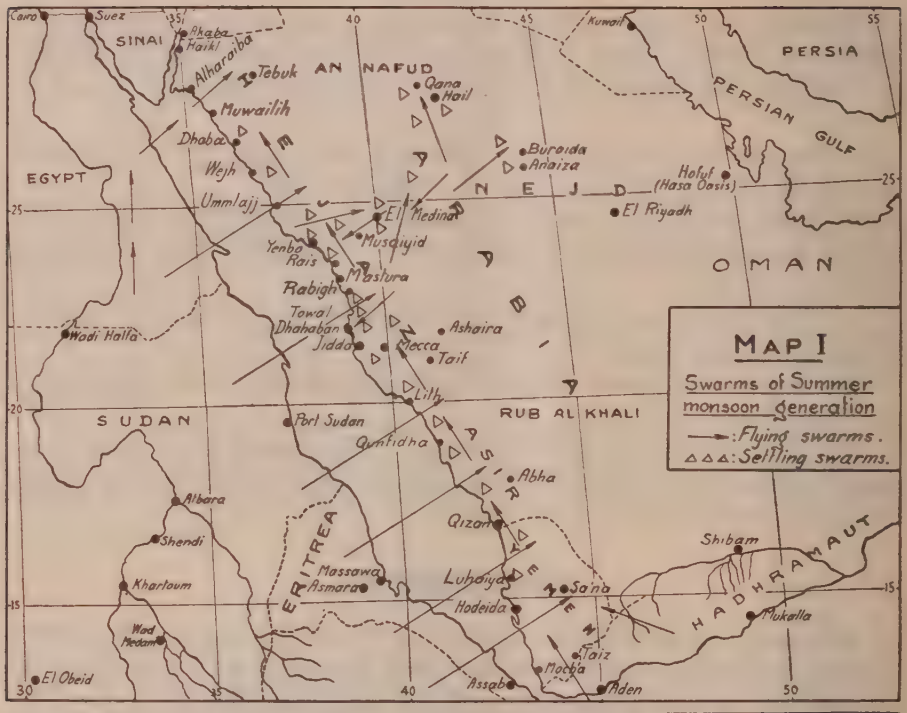
We must express our thanks and acknowledgments to the staff of the British and Egyptian Legations at Jedda especially Mr. Mann, the Secretary of the first, and Abdel Hamid Munir Bey, the Chargé d'Affaires of the second.

The Middle East Supply Centre was also as kind as usual to supply us with all types of vehicles and spare parts. Major Matthews was indeed a great help to us in getting over all difficulties.

The Locust Research Bureau in London and its able Director Dr. Uvarov was our guidance in all technical matters.

I must admit that I am proud to be chosen by the Egyptian Ministry of Agriculture at the head of this campaign and am greatly thankful for the continuous help given to me.

Special acknowledgment must be given to all the members of this campaign who proved themselves to be worthy of their name in carrying out their jobs perfectly despite all hardships and difficulties. Any success achieved in this campaign is wholly due to them.


Cairo
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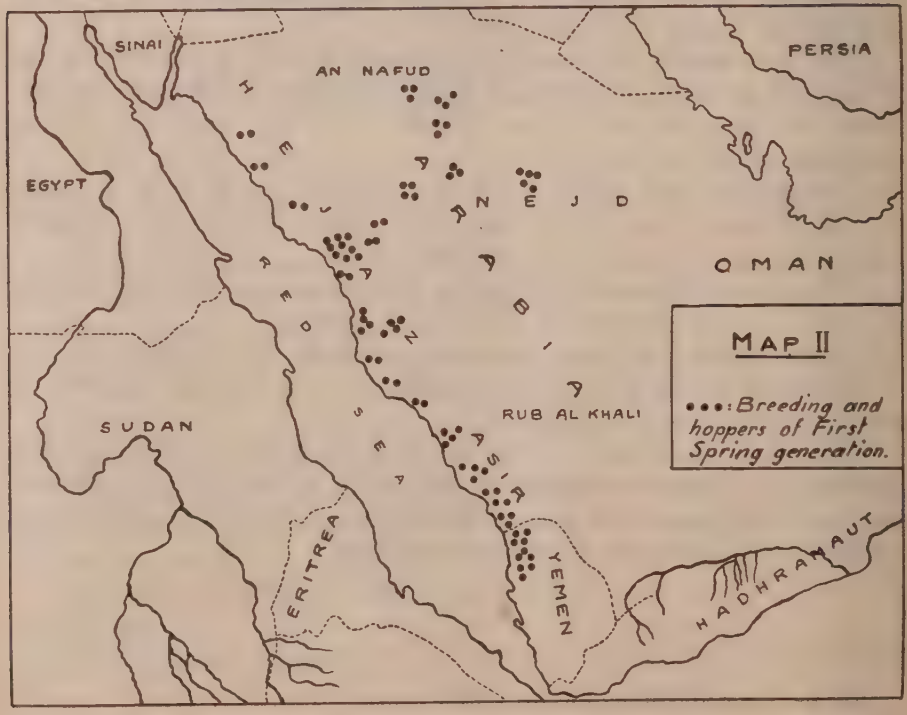
Ummlajj
El Medina
Yenbo
Rais
Musdiyid
Mastura
Rabigh
Tawal
Dhahaban
Jidda
Mecca
Ashaira
Taif
Wadi Halfa
Lith
SUDAN
Port Sudan
Qunfidha
RUB AL KHALI
Abha
Albara
Shendi
Khartoum
Massawa
Asmara
ERITREA
Qizan
Luhaiya
Hodeida
Sa'na
Shibam
HADHRAMAUT
Mukalla
Wad Medani
El Obeid
Taiz
Mocha
Assab
Aden
Kuwait
PERSIA
PERSIAN GULF
Buraida
Anaiza
Hofuf
(Hasa Oasis)
El Riyadh
NEJD
OMAN
ARABIA
ASIR
HEJAZ
YEMEN
MAP I
Swarms of Summer monsoon generation
: Flying swarms.
: Settling swarms.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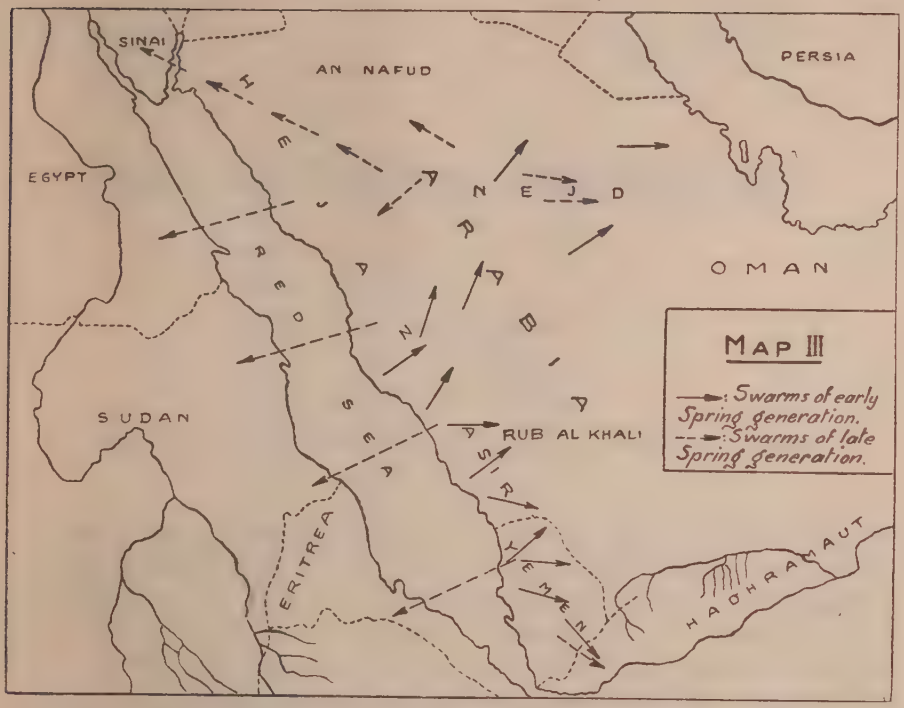
RUB AL KHALI
ASIR
ERITREA
YEMEN
HADHRAMAUT
MAP II
: Breeding and hoppers of First Spring generation.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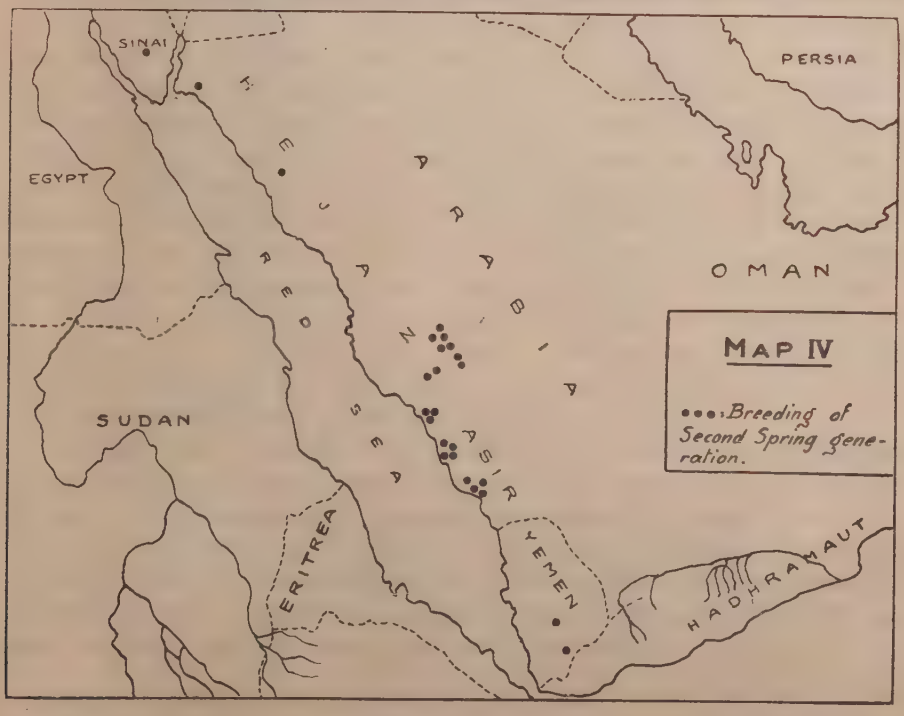
SIRYEMEN
ERITREA
HADHRAMAUT
MAP III
: Swarms of early Spring generation.
: Swarms of late Spring generation.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SUDAN
ASIR
YEMEN
ERITREA
HADHRAMAUT
MAP IV
: Breeding of Second Spring generation.

Notes on *Eriophyes mangiferæ* S.N.

[Acarina]

(with 1 Text-Figure)

by Ahmed Salem Hassan, Ph.D.,
Department of Entomology, Faculty of Agriculture (Giza)

Young mango trees are liable to be severely injured by the attack of *Eriophyes mangiferae* S.N. which has proved to be of economic importance. The attack of this mite was first noticed by the writer in a garden at Facous (Sharkia), about 1939 on young mango plants, when they failed to grow normally. During winter of that year thrips were found in the buds and were suspected of causing the injury. In August of 1940 abnormal bud formations began to show up, and close examination showed the mite within the buds. A nearby nursery from which the plants were brought, was examined, and nearly all the plants showed typical malformations of growth. The mite multiplies rapidly during summer, buds are attacked and the young leaves fail to take normal size; other buds are formed and duly attacked a bud may grow and the internode becomes elongated but terminates with another malformed bud (see Figure). If kept for several seasons, the young plant may fail to grow to a normal shape, the stem become thickened, many buds develop but the young growth again fail to develop normally.

It is known that the most suitable land for growing mango trees is a light soil with a sandy subsoil. Plants grown in such land, and well cared for, may grow into large trees in spite of mite injury, and in such cases the attack becomes of little importance.

Similar injury to mango trees was also noticed in other parts of Sharkia province where mango is grown, particularly in recent years due to the practice of bud propagation. The attacked twig shown in Figure, was taken at Kobri El Kobba near Cairo. The writer believes that the practice of budding and moving about of young plants have accelerated the dispersal of the mite. Therefore, buds must be taken only from trees known to be free from the mite, and only healthy young plants should be grown.

As to a possible chemical control, two applications of summer Volck oil of 0.5 to 1% will be useful to kill as many as possible of the mites

during summer. This will allow good normal growth, giving the young tree a chance of escaping injury, provided the soil is the type mentioned above.

Two injourious insects new to Egypt

[Thysanoptera, and Diptera : Cecidomyidae]

by Ahmed Salem Hassan, Ph.D.,
Department of Entomology, Faculty of Agriculture (Giza)

At the end of January 1944, the writer issued the second edition of his book « *The Economic Insects in Egypt* » published in Arabic with scientific names in Latin. The book is being used as a text-book by the students of Agriculture and as a general reference. In this edition, the writer has briefly included some of his findings and observations on two injurious insects newly found in Egypt.

(1) Thrips spec.

About 1940 a *Thrips* of the Sub-Order Tubulifera, Family *Phloeothripidae* was found injuring the leaves of *Ficus nitida* at Giza. The leaves are rolled towards the upper surface, and in most cases both edges get together towards the surface about the midrib, with the tip of the leaf curving downwards while its tissue gets slightly thickened. Inside the rolled leaf a considerable number of a large sized black thrips with grey wings is found, with hundreds of white eggs. The injury is quite noticeable in the summer especially on the young growth. At this time of the year, the injured leaves are green tinged with reddish brown. In the autumn the injured leaves turn brown. The attacked foliage at the tip of the branches look as if it were scorched by fire.

This injury was first noticed at Giza as mentioned above and was later found in Sharkia and Qualubiya provinces.

(2) The Violet midge : Perrisia affinis Kief.

This cecidomyid fly was reared in 1940 from injured violet leaves, at the Faculty of Agriculture farm at Giza. The injured leaf rolls upwards around itself. One or more fully grown larvae might be found inside the rolled edge.

The injury starts in the tender heart leaves and is quite noticeable in the older ones which may dry up later. The flower crop is liable to be affected due to this injury. The attack starts in July and August, is at its height in October, and ends late in November.

For control measures, it is advised to cut and burn the injured leaves as soon as they show signs of attack, thus preventing the fly from completing development and starting new generations.

Gynaikothrips ficorum Marchal in Egypt

[Thysanoptera]

(with 12 Text-Figures)

by George Morcos
Terchnical Assistant,
Entomological Section, Ministry of Agriculture.

Gynaikothrips ficorum Marchal to my knowledge was found for the first time in Egypt by my colleague El-Sayed Husny Effendi who brought a sample from Alexandria on the 12th of January 1941. A survey carried out all over the country during 1941-1943 revealed its existence also in the coastal regions around Alexandria and Port-Said, all over the Nile Delta, in Upper Egypt up to Beni-Suef, and in the Fayum. This insect has been already recorded from Mexico, Canary Islands, Algiers, Italy (Palermo), Bombay, Coimbatore, Bangkok, Singapore, Sumatra, Java, and Formosa.

Gynaikothrips ficorum Marchal has been described in 1908 (*Bull. Soc. Entom. France*) under the genus *Phloeothrips* (sensu lato). Other records are those given by Karny (*Fauna exotica*, 11, num. 5, p. 19, 1912) and Houard (*Ann. Soc. Entom. France*, LXXXI, pp. 56-58, figs. 103-108, 1912).

This species is closely allied to *Gynaikothrips uzeli* Zimm. The terminal joints of the antennae are obviously darker in *ficorum*. In *uzeli*, the hind-angular bristles of the pronotum are long, the fore-angular comparatively well developed and somewhat shorter in the male.

In Egypt, *Gynaikothrips ficorum* Marchal attacks only *Ficus nitida* Thunb. (*retusa* L.). Infested leaves curl up (fig. 1). The insect hides gregariously inside the curling, and moves in a scorpion-like manner, curving the end of its abdomen upwards. Sometimes over 500 individuals of different stages were counted on a leaf. On the hot days of August it may fly and drop on one's clothes and sometimes into the eyes causing irritation.

Spraying of infested trees is not effective owing to the folding of the leaves. Experiments with hydrocyanic gas are of dangerous use.

The following predators of *Gynaikothrips ficorum* Marchal has been recorded in this country :

Telmatophylum insigne Reut. (Hemiptera-Termatophylidae), *? Triphleps* or *Piezostethus* spec. (Hemiptera-Anthocoridae), and *Chrysopa vulgaris* Schn. (Neuroptera-Chrysopidae). All of them attack the pupal stage of *Gynaikothrips ficorum* Marchal, but they cannot be considered as a means of control because they are scarce.

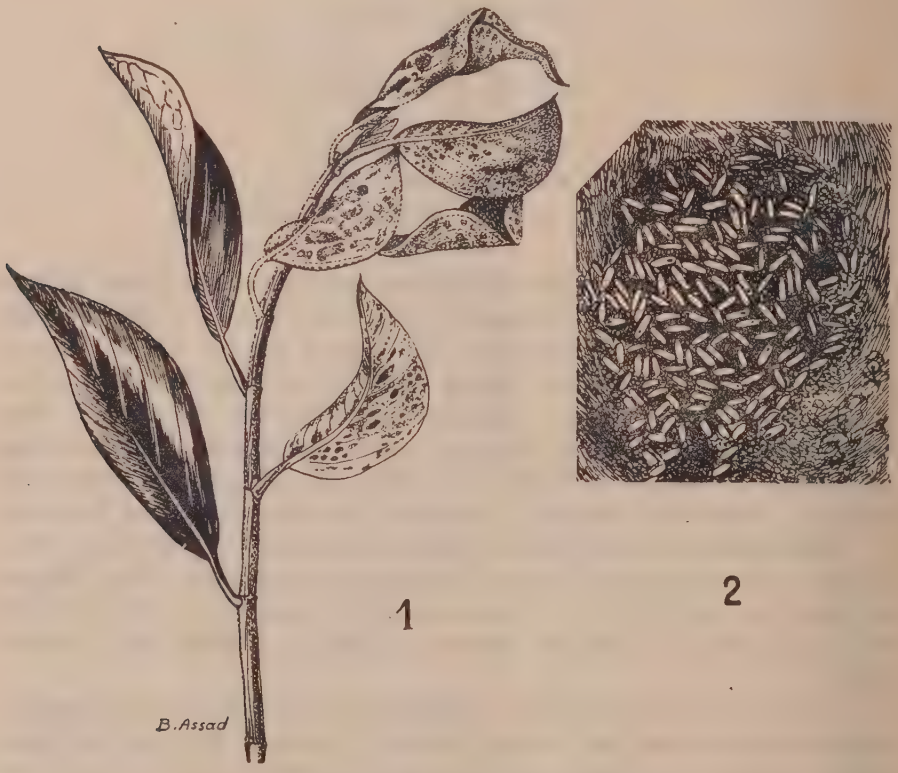

Fig. 1 : Twig showing infested leaves (natural size).
Fig. 2: Eggs laid on the surface of a leaf (× 7).

The morphology of *Gynaikothrips ficorum* Marchal and its early stages being still imperfectly known, a full description is given hereunder.

I am greatly indebted to Mr. A. Alfieri, the General Secretary of the Fouad Ist Entomological Society, for his help in the identification of this insect and other useful suggestions in connection with the present paper.

Morphology of Gynaikothrips ficorum

Egg (figs. 2 and 3) yellowish-white, cylindrical, both ends rounded; chorion ornamented with hexagonal cells; length 395, width 170μ.

1st instar larva (fig. 4) of a waxy colouration, with the end of the abdomen somewhat brown; tube waxy, eyes red.

2nd instar larva (fig. 5) usually yellow, with the end of the abdomen brownish, and the tube black.

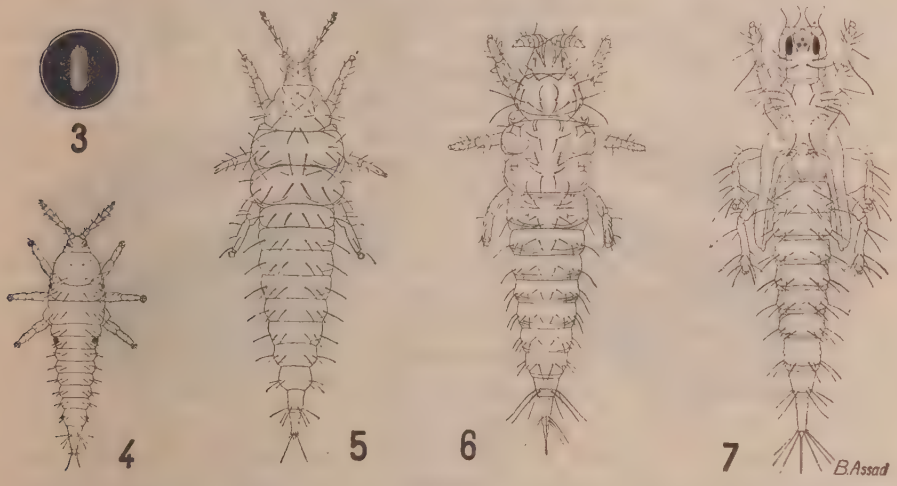

Fig. 3: The egg (×20). — Fig. 4: Larva, first instar (×20). — Fig. 5: Larva, second instar (×20). — Fig. 6: Prepupa (×20). — Fig. 7: Pupa, first stage (×20).

Prepupa (fig. 6) whitish-yellow; antennae bearing three curved bristles; length of antennal sheaths 120-150 (134)μ; width of head 189-260 (236), of pronotum 327-473 (410), of ninth segment 112-189 (160)μ; length of tube 137-155 (150), of dorsal bristles on ninth segment 155-172 (167)μ; all bristles almost colourless. Total body-length 1.590-2.442 (2.083) mm.

The *pupa* assumes two stages (fig. 7 shows first stage).

Adult black; fore tibiae, tip of middle and hind tibiae yellow; tarsi yellow; first and second joints of the antennae black, the latter fading to yellowish-brown at its tip, all other joints yellow; bristles on body yellowish the anal ones somewhat darkened at their base; wing pads hyaline.

Female: Head (fig. 9) length 323-353 (337), width across cheeks 223-284 (257)μ; marginal length of eyes 92-102 (96), total dorsal length 102-122 (113)μ; cheeks slightly widened behind the eyes, postocular bristles knobbed, 56-77 (65)μ, and situated behind the eyes at a distance of 31-51 (42)μ; antennae length 550-617 (580)μ; measurements of joints : 36-43 (36-

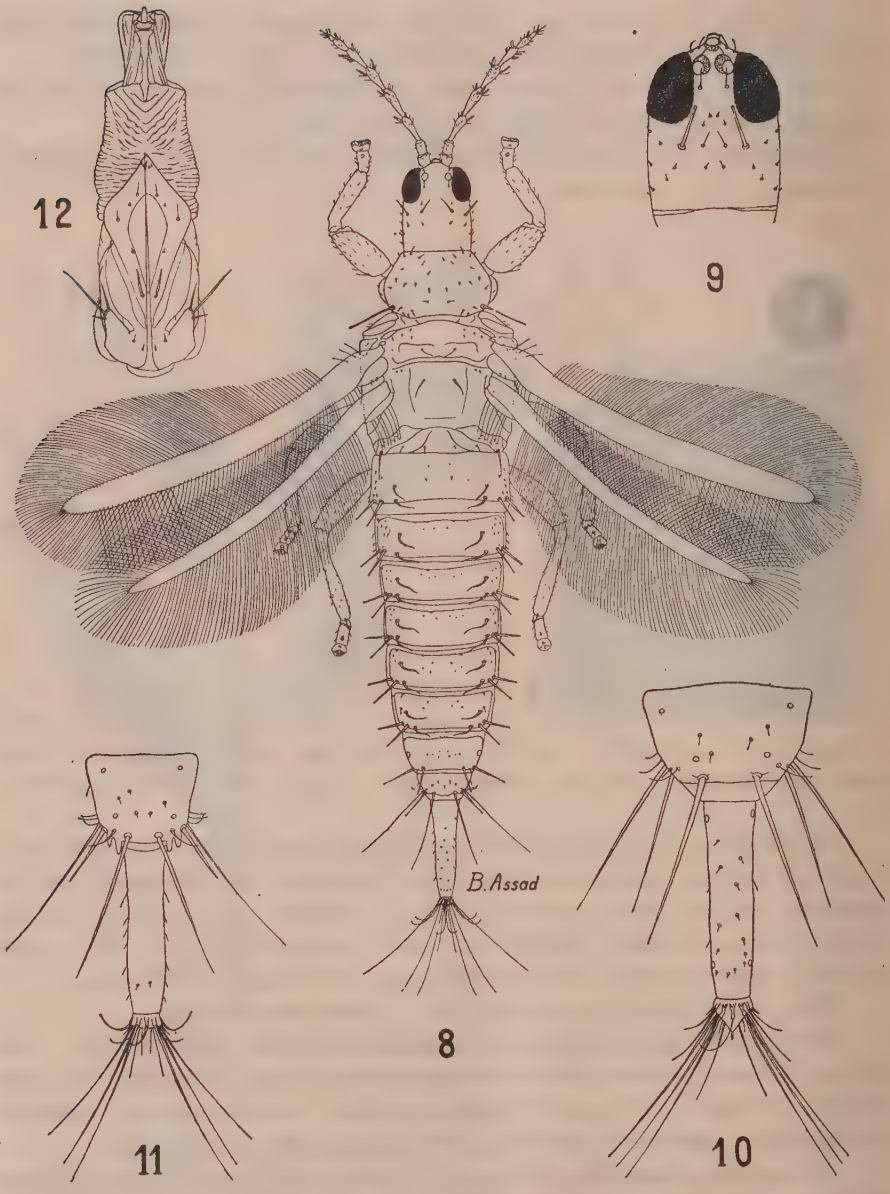

Fig. 8: *Gynaikothrips ficorum* Marchal, adult male (×35). — Fig. 9: Head (×60). — Fig. 10: Female ninth abdominal segment and tube (×60). — Fig. 11: Male ninth abdominal segment and tube (×60). — Male genitalia (×160).

43), 43-53 (33-36), 86-99 (26-36), 86-105 (36-43), 86-102 (33-40), 83-99 (26-36), 53-66 (17-26), 26-50 (15-17)μ; joints asymmetrical, third joint with one sensé cone, fourth with four, fifth and sixth with three, seventh with one, eight with two; pronotum length 200-235 (218), width without coxae 312-376 (357), including coxae 388-441 (420)μ; bristles on hind angles knobbed, 132-155 (143), on femora pointed and equal in length, 83-99 (83)μ; forewing pads broadly rounded at the end; length of fore wings 1.172-1.229 (1.218), of hind wings 1.040-1.096 (1.057) mm.; three knobbed yellow basal bristles on hind wings measuring 54-77 (63), 64-96 (78), and 71-109 (89)μ respectively; long bristles on sides of abdominal segments knobbed, short ones pointed, pale, those on ninth segment (fig. 10) pointed, b.1 275-310 (298), b.2 258-344 (323), b.3 232-284 (253)μ; tube (fig. 10) long, 347-406 (377), width at base 59-112 (89), at tip 53-82 (56)μ; length of long anal hairs 294-335 (307), of short ones 76-94 (84)μ. Total body length 2.953-3.467 (3.226) mm.

Male (fig. 8) : Head length 267-318 (297), width across cheeks 206-241 (225)μ; marginal length of eyes 82-97 (89), total dorsal length 87-112 (102)μ; postocular bristles 51-66 (59)μ, and situated behind the eyes at a distance of 36-51 (41)μ; antennae length 450-588 (532)μ; measurements of joints : 33-40 (36-40), 43-53 (26-33), 83-96 (26-33), 86-99 (33-36), 83-92 (31-36), 76-86 (26-35), 50-66 (17-26), 40-43 (13-20)μ; pronotum length 171-206 (185), width without coxae 259-347 (308), including coxae 312-388 (352)μ; bristles on hind angles 92-139 (112), on femora 73-99 (84)μ; length of fore wing pads 1.115-1.266 (1.214), of hind wings 1.021-1.077 (1.055) mm.; bristle 1 on ninth segment (fig. 11) 206-275 (237), b.2 53-69 (56), b.3 232-284 (262)μ; tube (fig. 11) length 235-318 (287), width at base 59-94 (74), at tip 41-59 (45); length of long anal hairs 253-294 (265), of short hairs 59-100 (78)μ; genitalia as shown in fig. 12. Total body length 2.247-3.081 (2.652) mm.

What the ancient semites knew about the Locust

[Orthoptera]

by Dr. Mamoun Abdel Salam,

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D.I.C. ; Ph.D. London.
Sub-Director, Plant Pathology Section,
Ministry of Agriculture, El Dokki.

It is evident from the Old and New Testaments, the Holy Koran, the Hadith of the Prophet Mohamed, the ancient proverbs and poetry of the Arabs that the Semitic people in the Middle East, the Arabs in particular, had from remote times great knowledge about the life of the locust and its movements. An excellent account of the devastating action of locust in Egypt is given in Exodus X, 13. King Solomon in his Proverbs described it as having no king but flies out in swarms. The Holy Koran referred to it as one of the plagues inflicted upon the Egyptians by the God of Moses.

It is recorded that the Holy Prophet was praying at mid-day with the locusts hopping around him. According to the Kaliph Omar, the Prophet Mohamed, on being asked by a man who killed a hopper in the sanctuary of Mecca, advised him to sacrifice a small lamb. Ibn Abbas related that when Meccan lads collected locusts from a big swarm which entered Mecca, the Prophet said : « If they only knew they will never take it », meaning that locust hunting is prohibited in Holy Mecca.

The Prophet in one of his Hadith said : « Their arrows are like a big swarm of locust ». On mentioning the locust in the presence of the Prophet, he said : « I wish we had one or two bands of it », showing how fond the Arabs were of locust for food.

The Prophet Mohamed was once asked : « How will the people behave afterwards ? ». His answer was : « Like locusts the strong feeding on the weak until the Day of Reckoning ». This is a clear indication that the Arabs knew cannibalism in locust.

The Prophet related that Mary the Virgin when once hungry, a small swarm appeared to her from which she collected some locusts for food.

It is related that Aysha sent to her husband the Prophet Mohamed some roasted locust.

The Prophet said of his battle of Honein : « I see an army of locusts », meaning the infantry were as dense as a locust swarm.

The Arabic literature is full of proverbs, sayings, and poetry about locusts. They said : « The people feel scarcity when the noisemaker (i.e. the locust) and the howler (i.e. the wolf) come ».

The Ancient Arabs were in the habit of calling their dromedaries and mares by such locust names as *garada* and *kheifana*, because of their swiftness and dexterity. The great pre-Islamic Poets Antara and Umru'ul Keiss called their mares *kheifana*, and the latter likened the horses in battle to a swarm of locusts..

The ancient Arab Proverb « The locust makes a noise », was usually said when someone falls in a dilemma which troubles him making him uneasy, like the locust which on feeling the intense heat of the day becomes uneasy and flies making noise with its legs.

The Ancient Arabs nicknamed oppression, treason and catastrophe by *um-gundub* (i.e. the mother of locust). One of their sayings is « The people fell in um-gundub » (i.e. in a catastrophe). They were also in the habit of calling persons by locust names. Thus *garada* (i.e. locust) was the name of a woman in pre-islamic Arabia. She is said to have sung to the members of the mission sent by Aad to Mecca, for watering in the Sanctuary, in order to divert them from their benevolent act. The Ancient Arab poet Ibn-Mukbil sang of this in one of his poems « Enchantment similar to that when Garada enchanted the watering mission by singing to them day and night ». It is also recorded that the *Garadatein* (i.e. the two locusts) were two female singers in pre-islamic Mecca, celebrated for their beautiful voice and good singing. They are also said to be singers to the Arab Hing Al Numan. *Gundub* (i.e. locust) is also a person's name.

The people of the Middle-East were in the habit of feeding on locust from very remote times as is well illustrated by the Old and New Testaments. The Israelites were allowed to feed on it in the wilderness of Sinai during their Exodus from Egypt. John the Baptist is noted to have subsisted on locust and honey. The Prophet Mohamed said to his believers : « You are allowed to feed on two corpses and two bloods : fish, locust, liver and spleen ». It is stated in the Bukhari that the Prophet Mohamed used to eat locust with his army during his raids. One of his companions Ibn Aufaa said : « We raided with the Prophet six or seven times during which we used to eat locust with him ». The Arabs, from old, had different ways of preparing locust for food. They may add the ground dried locusts to the flour for making bread, may also stew the fresh locust in the pan calling it *hamisha*, a word meaning that which stirs with a noise on boiling in the pan, and may roast it calling it *mahsous* (i.e. the roasted locust).

The ancient Arabs did not consider the locust as an insect, but as a type of bird, calling it *taifour*, or *touay'er* (i.e. birdlet or small bird).

Judging from the many names given to the locust in Arabic and Hebrew the locust is native to Arabia. In Arabic it is called *garad* because it devours off all vegetation from the ground. The word *garad* is applied to both the male and female. The male locust is called in Arabic *inthab*, *usfour* (i.e. sparrow), or *gundub*. The word *gundub* and *kaml* may also mean the small locust. The female locust is called *unthio'wana*, *aisa'a*, *araada*, or *dubasa'a*. The locust is also called *husbaan* as mentioned in the Holy Koran. It is also called in Arabic *hassa*, because it devours everything on the ground, leaving it bare and naked. Another Arabic name for the locust is *sirwah*, because it moves from one place to another.

The ancient Arabs knew about the different stages of development of locust, oviposition and movements, as judged from the vocabulary and the description in their manuscripts and lexicons. The verbs *gharaza*, *razza*, and *mataha* mean that the locust inserted its abdomen in the ground for oviposition. The Arabic verb for oviposition is *sara'a*, and the egg-area is *maghraz*. The ovipositing locust is called *sarou'*, and the egg-mass *sur'u*, or *makn*. or *makan*. The pregnant female is called *makoun*, meaning the female locust which keeps the egg-mass in its abdomen, while that which laid its egg is called *silka*.

The Arabs call the newly emerging nymph, while still in the amnion, *sirwa*, describing it as greyish white. The Arabic term *daba* is given to all the nympheal stages previous to wing appearance. They called the nymph of the first instar *kamass*, and that of the second instar *hibshan* (i.e. Abyssinian) because of their black colour. The Arabs stated that on moulting the *hibshan* give the *yarakan* with black and yellow markings which is apparently the third instar nymph. All these instars are collectively called by the Arabs *harshaf*, which they describe as being highly voracious. This word is still used in Syria. The Arabs knew the fourth instar nymphs by the terms *meayan* or *kheifan*, which they describe as having yellow and white lines or markings. The Arabic name for the fifth instar nymphs is *muraggal* or *kutfan*, being called by the latter name because of the appearance of the wing-bases, and because the insect in this stage does not fly but hops like a creature with tied shoulders or legs. The insect in this stage is also called *utab* (from the Arabic verb ataba, meaning to hop or jump). The sixth instar (i.e. the sexually immature adult) is called by the Arabs *ghaugha'a*. This term is metaphorically given to the mob because of the great noise and hubbub it makes. Lastly they call the sexually adult *garad*.

The ancient Arabs knew of the change of colour in the locust for maturity, giving it the term *tasyeeh*.

They had also correct knowledge of the anatomy of the locust. They called the mandibles *ta'asheera* (that with which it bites), the leg-spines *ta'asheer*, and the ovipositor-sheath *ushratain*, *athna'a*, or *attwa'a*, describing the last as a knot at the base of the abdomen in the form of two claws by which the insect pushes its abdomen in the ground to lay the eggs. They called the two claws at the base of the leg by *minsharain*. The hypopharynx they termed *nukha'a*, and the pronotum *bukhnuk*. For the wing-bases they gave the name *minkabain*, the forewings *thahrain*, and the hindwings *kishrain* (i.e. the two scales). Their term for thorax was *gawshan*, which they described as having six hands attached to it, and that for the abdomen *surm*.

The Ancient Arabs knew of locust congregation to form swarms, and were well aware of the locust movement. Thus they called its circling movement *tahweem*. They used the verb *saama* to express the congregation of locust, *hamasha* to its movement to take to wing, and *irtahasha* to describe the locust when in layers one on the top of the other.

They called the front of the swarm *eiran*, meaning the few scattered part of the swarm. Swarms are called by different names in Arabic according to their magnitude and density. The small bands are called *sheetan*, and the large *tabak*, because it is like a cover or a cloud. The *rigl* is a band of locust filling the space of one mile. Bigger swarms are called *zahf*, and still bigger ones are called *hizka*. Very dense swarms covering the horizon are called *aared*, *a'rd* (i.e. the great army), or *sudd* (i.e. that which blocks the horizon).

The Arabs call the noise of the locust in flight *sareer*, or *fasseess*, and the noise of its eating *hanshaza*.

It is extremely interesting to state that the old Arab writers were aware of the phases of locust, which were clearly described by Ibn Fadl'ellah El Omari El Dimashki, who died in 749 A.H. (1348 A.D.), in his manuscript El Masaalek in which it is said : « The locust is of two kinds. The first is called *al faris* (i.e. the cavalry) being the one that flies high in the air (this is apparently the migratory phase). The second is called *al-raagil* (i.e. the infantry) being the one which is solitary (this is apparently the solitary phase). When the spring is over this seeks good soft soil on which it settles and digs with its abdomen holes in which it lays its eggs which after burying them it flies, to be eradicated by birds, heat and light. When the year is over and spring comes these buried eggs hatch small nymphs on the surface of the ground. They said each locust lay a great number of eggs. When these nymphs are out of the eggs they eat what they find in the way of vegetation and trees until they become able to fly, when they take to wing shifting to other places. They do this for ever and ever as ordained by God the Almighty ».

This old Arab description strangely agrees with Dr. Uvarov's new

« Theory of Phases ». I am positively sure that the world locust specialist will feel pleased to find in the old Arab writer a supporter to his new theory.

The Old Arab writers dealt with methods of locust control, some being sympathetic magic, while others have a practical value. This is well illustrated in the old manuscript called « Chosen Gems from Greek and Nabattean Agriculture », by Shams El Ansaari Ed'Dimashki, who died in 727 A.H. (1327 A.D.). Thus, for protecting crops from locusts, they advised burying in the ground as many as possible locust hollow brass effigies inside each of which a live locust is put. They also stated that trees with beetles hung on them will not be approached by locusts. Smoking with burning locusts, scorpions or ants, was said by Old Arab writers to drive away flying locusts. They also stated that locusts could be smoked away with the wind by burning reeds, hemp and sulphur together with the bones of hoopoes and tortoises and straw. The insects could also be driven away by spraying the infested vegetation with a concoction of donkey's dung cooked with lupins and salt, or with a concoction of black cumin (*Nigella sativa* L.) left to boil slowly for seven days in camel's urine. If this mixture is dried and then burnt, the emanating smoke makes the locusts perish. They also advised for controlling locusts in the nympheal stage (i.e. the hoppers), to drive them to specially prepared trenches, where they are burnt, or to deep ditches and deserted wells, or to throw them day and night into huge boilers with boiling water.

Acknowledgment

The writer wishes to thank Mohamed Soliman El Zoheiry Eff., Director of the Entomological Section, Ministry of Agriculture, Cairo, for the help he rendered in revising the translation of the Arabic technical terms into English.

Les dégâts de la courtilière et leur importance en Egypte

[Orthoptera : Gryllotalpidae]

(avec 2 Figures et 2 Planches)

par Antoine Cassab

L'extension progressive de nos cultures maraîchères et potagères durant ces dernières années a mis en relief les pertes considérables qui leur sont causées par la courtilière. Ce redoutable fléau n'épargne pas davantage nos grandes cultures ; leur rendement, dans certains cas, en a été sensiblement réduit. Il s'attaque indistinctement aux grains en germination, aux racines, bulbes et tubercules des plantes les plus diverses : pomme de terre, patate douce, topinambour, colocasse, betterave, carotte, radis, navet, panax, oignon, ail, poireau, pastèque, melon, abdellawi, concombre, courgette, laitue, artichaut, chou, piment, aubergine, épinard, tomate, dolique (lablab), haricot, gambier, blé, orge, maïs, canne à sucre, coton, jeunes plants d'oranger, mandarinier, bigaradier, citronier, plantes à fleurs (notamment les dahlias) ou d'ornement, plantes à rhizomes, pelouses et terrains de golf.

Fig. 1. — La courtilière, *Gryllotalpa* spp. (grandeur naturelle).

La période d'activité de la courtilière s'étend de Mars à Octobre ; ses dévastations et leur intensité sont en rapport étroit avec les conditions climatériques de la région cultivée, la nature des terres, l'époque de culture, l'apport d'engrais organiques, et enfin avec la densité de la population gryllotalpienne dans le sol.

Une distinction est à faire entre les dégâts en rapport avec l'alimentation de l'insecte et ceux dérivant de son habitat et de ses déplacements souterrains ; dans le premier cas, les grains en germination, les jeunes racines, les tubercules et les bulbes sont partiellement ou totalement dévorés ; dans la seconde alternative, la courtilière bouleverse, décortique ou détruit les grains, cisaille les racines, écorche ou endommage les tubercules et les bulbes. Les plantes attaquées se dessèchent et meurent ; on observe parfois des ilôts dénudés dans la culture ; le réensemencement s'impose. Les cavités ou galeries creusées dans les bulbes et les tubercules leur occasionnent une pourriture qui déprécie la valeur du produit. Les attaques de la courtilière se manifestent dès l'ensemencement et constituent un danger pour la plante au moins jusqu'à son troisième mois de croissance.

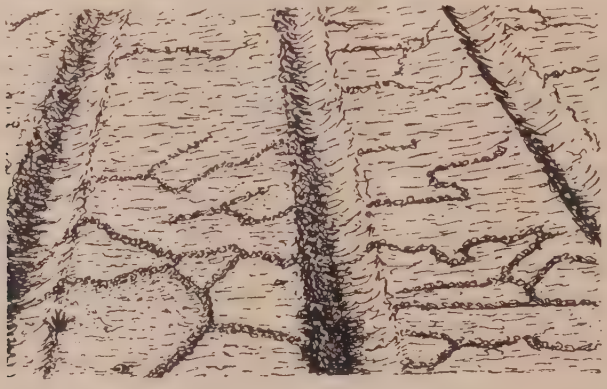


Fig. 2. — Crêtes sinueuses ou bourrelets de terre à la surface du sol indiquant la présence des galeries souterraines de la courtilière.

Les multiples facteurs qui régissent le rendement des cultures, joints à la destruction partielle ou totale des plants attaqués, font comprendre combien il est peu aisé d'établir avec précision le pourcentage des pertes directement imputables à la courtilière. Néanmoins, dans ce travail, on trouvera un aperçu général de la situation telle qu'elle s'est présentée au cours de nos investigations.

Cultures maraîchères et potagères

La plupart de ces cultures se font sur des superficies restreintes et le plus souvent cloturées. La terre est constamment amendée par des apports en limon du Nil, dont le pourcentage en matières organiques est de 15.02 à l'époque de la crue, et de 10.37 à l'étiage. Ce limon fertilise la terre, l'ameublit, la rend profonde. En outre, la terre est fumée à la *sabla* (fumier

de cheval), qui contient 25.50 % de matières organiques, portant ainsi à 40.52 le pourcentage total des matières organiques incorporées au sol à l'époque de la crue du Nil. Tous ces facteurs, joints à la diversité et à la continuité des cultures, constituent un ensemble favorable à l'évolution de la courtilière. L'arrosage fréquent lui procure une fraîcheur qui la protège des rigueurs du soleil, et les labours peu profonds ne l'expose pratiquement à aucun danger. Nids et galeries-refuges sont établis aux niveaux convenables suivant les circonstances, les saisons, l'abondance d'eau et de nourriture. Le réveil hivernal de l'insecte et son activité destructive coïncident avec l'époque des semailles. Les attaques les plus sévères ont été constatés dans les cultures avoisinant les grandes villes. Dans les provinces de la Béhéra, Calioubieh et Ghizeh, durant les années 1935-1940, la moyenne annuelle des plantes attaquées et partiellement perdues a été de 25.6 pour la betterave, 24.2 pour la carotte, 21.6 pour le navet, 16.5 pour le poireau, 13.2 pour la tomate, en enfin 10.6 % pour la courgette.

Grandes cultures

Parmi les plantes les plus attaquées la pomme de terre d'été vient en premier lieu, puis les cucurbitacées (pastèque, melon, abdellawi, etc.). Le coton a été uniquement pris en considération parcequ'il représente la plus importante culture du pays.

Coton (*Gossypium* spec.)

Plusieurs cultures de coton ont été examinées durant les années 1935 et 1936. Les semis ne sont guère attaqués, mais le pourcentage des jeunes cotonniers cisaillés et détruits s'est avéré être 3.4 pour la province de la Béhéra, 3.1 pour la Gharbieh, et 1.8 pour celle de Beni-Souef. Tant qu'il est possible de réensemencer ces pertes se résument par un nouvel achat de graines et des frais de réensemencement supplémentaires. Après cette période tout cotonnier cisaillé ne peut être remplacé. Dès lors le pourcentage des cotonniers détruits tombe à 0.8, 0.5 et 0.1 par province respective. Si l'on considère qu'il y a 40000 cotonniers par feddan, chacun produisant 8 grammes de fibre et 15 grammes de graine, la perte sera de 320 cotonniers pour la Béhéra, 200 pour la Gharbieh et 40 pour Beni-Souef, en d'autres termes de kilos 2.560, 1.600 et 0.320 en fibre, et kilos 4.800, 3.000 et 0.600 en graine respectivement.

Pastèque (*Citrullus vulgaris* Schrad.)

La culture de la pastèque et de la plupart des cucurbitacées se pratique, dès Mars, dans les terres sablonneuses bien aérées et fumées au *zibl el*

hammam (colombine), dont la teneur en matières organiques est de 40.8 %. Ces divers éléments, essentiellement favorables à l'habitat et au développement de la courtilière, sont complétés par la coïncidence de l'époque de culture de la pastèque avec celle du réveil hivernal de l'insecte, dont l'activité est particulièrement grande dès ce moment. On peut estimer qu'après la pomme de terre d'été, la culture la plus exposée aux ravages de la courtilière est bien celle de la pastèque.

Deux années (1935-1936) d'investigations intensives menées dans les provinces de la Béhéra, Calioubieh et de Beni-Souef ont démontré que la plus forte attaque a lieu juste après l'ensemencement, et qu'elle affecte les jeunes pousses dans la proportion de 11.4, 9.9 et 5.3 % pour chaque province respective. Les plantes détruites sont réensemencées, d'où nouveaux débours en semence et en main-d'œuvre. L'attaque continue après le réensemencement dans un pourcentage de 1.6, 1.3 et 0.5 pour chaque province respective. Le fruit étant toujours en contact avec le sol n'est guère épargné. La courtilière y pénètre, en détruit la pulpe, le fruit s'amollit et pourrit. En résumé, les pertes annuelles se chiffrent à 43 pastèques par feddan pour la province de la Béhéra, 39 pour la Calioubieh, et à 13 pour la province de Beni-Souef.

Pomme de terre (*Solanum tuberosum* L.)

Cette solanacée est cultivée deux fois par an, en Février (culture d'été), et aux environs de la mi-Août à la mi-Septembre (culture d'hiver). Elle exige des terres légères qui seront fumées au *sebakh* ou *semad baladi* (fumier de ferme contenant 25.1 % de matières organiques).

La culture d'été est sans contredit celle de toutes nos cultures qui est la plus fortement ravagée par la courtilière. Il a été observé, durant les années 1935-1940, que la moyenne annuelle des tubercules attaqués s'élevait à 15.6 % pour la région du Delta du Nil, et à 16.8 % pour la province de Ghizeh. Dans la Haute-Egypte, notamment dans les provinces d'Assiout et de Guirgueh, ce pourcentage ne dépasse pas 0.5.

La culture d'hiver est de beaucoup moins exposée. En effet, 45 à 50 jours après sa plantation, la courtilière entre dans sa période d'hivernage et dès lors l'actvité destructive de l'insecte devient nulle. Ainsi, durant les années 1935-1940, la moyenne annuelle des tubercules attaqués n'a été que de 2.04 % pour la région du Delta du Nil, 2.6 % pour la province de Ghizeh, 0.1 % pour celle de Beni-Souef, et 0.8 % pour celle de Minieh. Dans la province de Keneh (Haute-Egypte), il a été enregistré un pourcentage de seulement 0.03.

Les dégâts causés aux tubercules sont manifestés par les cavités ou galeries, de forme et de dimension très variables, que la courtilière a creusées

dans la pulpe du tubercule pour s'en alimenter. La pulpe ainsi éliminée diminue le poids du tubercule. A volume égal, le poids moyen de 100 tubercules moyens attaqués est de 466 grammes inférieur à celui des sains. Dans le Delta du Nil la récolte donne un rendement moyen de 559 tubercules par kantar de 50 kilos. Le pourcentage d'attaque étant de 15.6, il s'y trouvera donc 87 tubercules non sains. Nous avons vu que les 100 tubercules attaqués perdent 466 grammes de leur poids, soit une moyenne de 4 gr. 66 par unité, d'où les 87 tubercules totaliseront une réduction de 405 grammes par kantar, ou d'un peu plus de 8 grammes par kilo. A cette perte il convient d'ajouter celle du poids réduit des tubercules attaqués. En effet, ces tubercules ne dépassent guère la grosseur moyenne du produit. Notons aussi que le prix commercial des tubercules attaqués est de trois fois inférieur à celui du produit sain.

Signalons, à titre de renseignement, que durant les années 1935-1937 nous avons examiné un lot de 5 kantars de pommes de terre provenant des domaines de Monsieur Aristo Devorakis de l'île de Mishla dans la province de la Menoufieh. Nous avons enregistré que le nombre moyen de tubercules par kantar s'élevait à 537, et le pourcentage des tubercules attaqués à 17.86. Ces chiffres confirment nos estimations précédentes.

Pour terminer, nous dirons que la lutte contre la courtilière, à l'aide d'appâts empoisonnés au phosphure de zinc 5 %, maïs ou riz concassé et eau, préconisée par l'auteur en 1937 (*Bulletin de la Société Royale Entomologique d'Egypte*, page 83), s'est avérée des plus concluantes. En effet, des essais faits à l'île de Mishla ont donné les résultats ci-dessous :

Parcelles non traitées (témoins) : pourcentage moyen d'attaque 18.4, rendement moyen au feddan 136 kantars.

Parcelles traitées une fois (immédiatement après le premier arrosage) : pourcentage moyen d'attaque 7.6, rendement moyen au feddan 137 kantars.

Parcelles traitées deux fois (après le premier arrosage, et 20 jours plus tard après le second arrosage) : pourcentage moyen d'attaque 5.4, rendement moyen au feddan 137 kantars $\frac{1}{2}$.

Parcelles traitées trois fois, la troisième fois après le troisième arrosage suivant de trois semaines le second) : pourcentage moyen d'attaque 4.8, rendement moyen au feddan 137 kantars $\frac{3}{4}$ environ.

Comme on le voit, le pourcentage d'attaque tombe au-dessous de la moitié dès le premier traitement, et plus bas encore aux second et troisième traitements. Nous en recommandons l'application dans l'intérêt même du cultivateur.

EXPLICATION DES PLANCHES

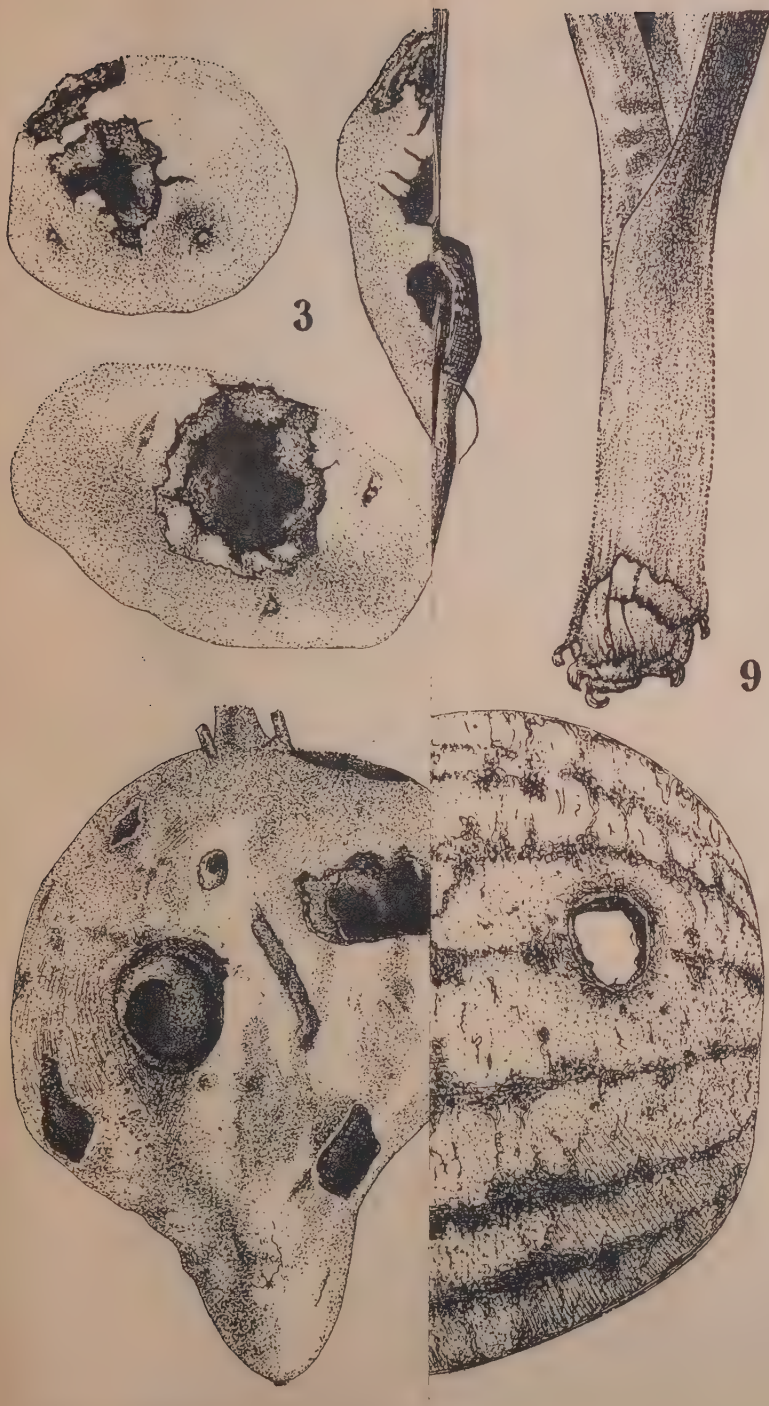
(Produits du sol égyptien attaqués par la courtilière)

Planche I

Fig. 3 : Pommes de terre. — Fig. 4 : Colocasse. — Fig. 5 : Carotte. — Fig. 6 : Navet. — Fig. 7 : Radis. — Fig. 8 : Oignon. — Fig. 9 : Poireau. — Fig. 10 : Pastèque (jeune plante). — Fig. 11 : Pastèque. — (Grandeurs naturelles).

Planche II

Fig. 12 : Laitue. — Fig. 13 : Artichaut. — Fig. 14 : Aubergine. — Fig. 15 : Epinard. — Fig. 16 : Jeune cotonnier. — Fig. 17 : Cotonnier (attaque occasionnelle). — Fig. 18 : Jeune citronnier. — (Grandeurs naturelles).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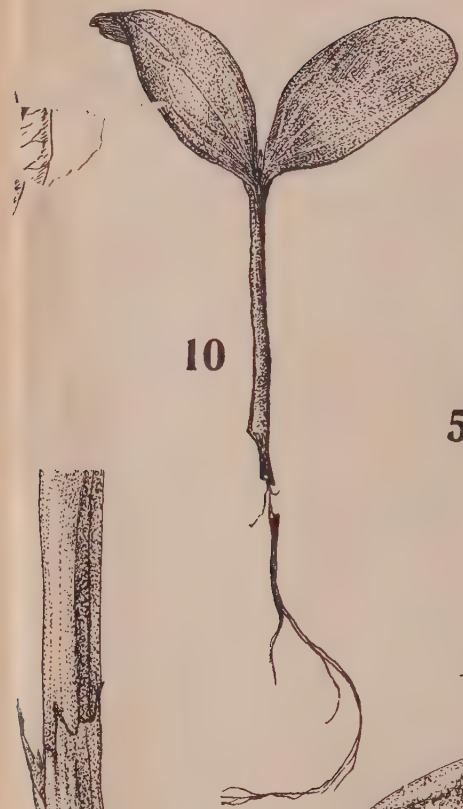

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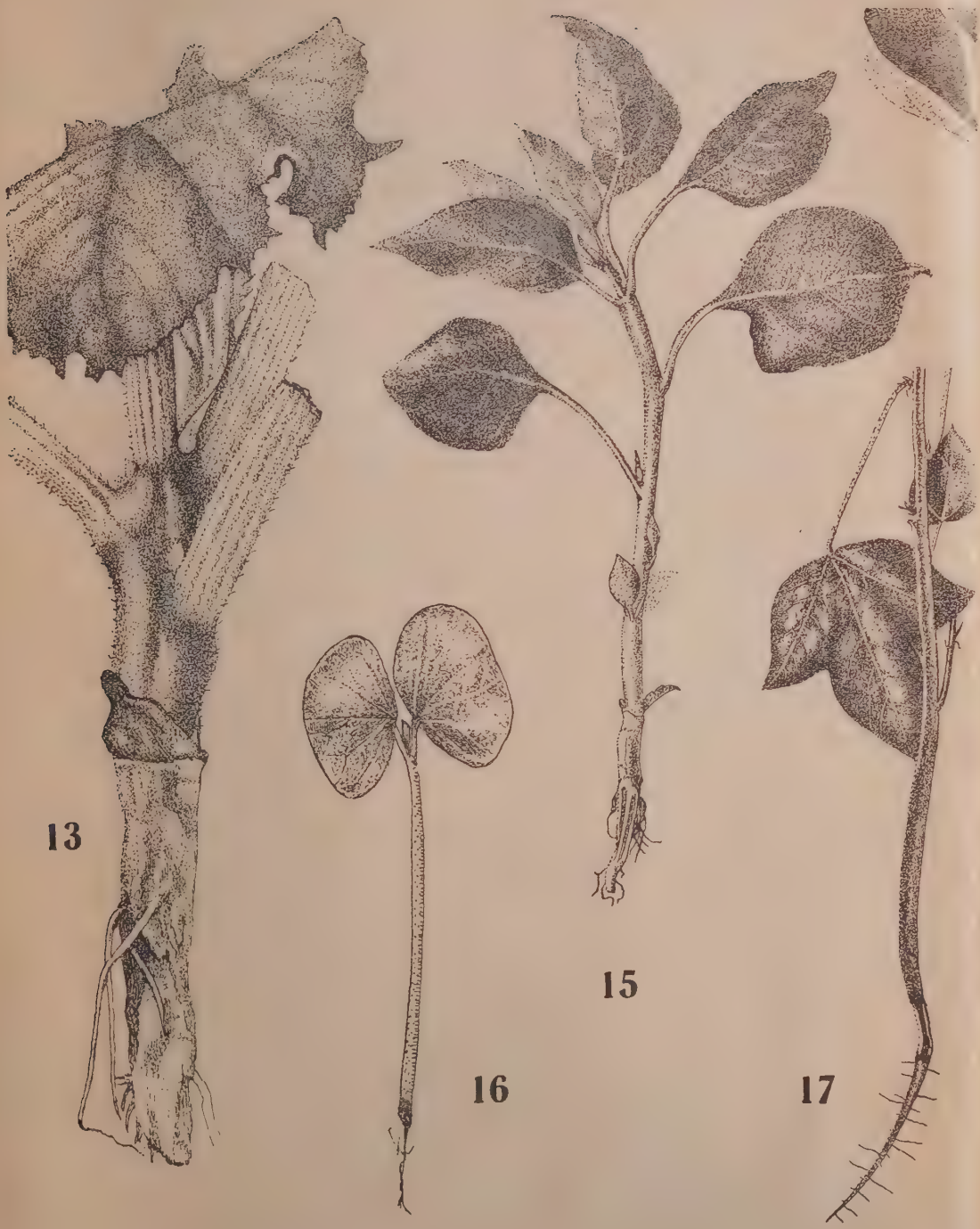

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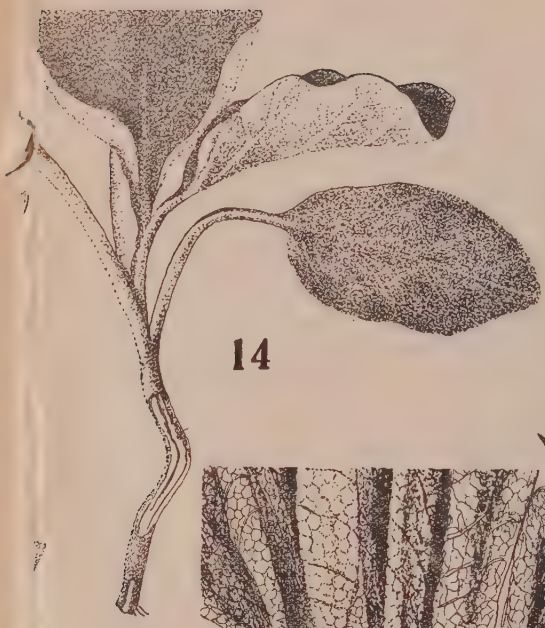

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DE LA

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DU

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1944

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